The Dental Digest.

Vol. III. CHICAGO, FEBRUARY, 1897. No. 2.

Original Contributions.

RECENT IMPROVEMENTS IN FILLING TEETH.

By G. V. Black, D.D.S., Jacksonville, Ill. Read at the Annual Clinic of the Chicago Dental Society, February 1 and 2, 1897.

Gentlemen: We are gathered here to-day to celebrate the thirty-third anniversary of the Chicago Dental Society in a great clinic. Many of you have left your homes and your practice to be with us and assist us by your presence and also to enter into the clinical work. To you, brethren from beyond the limits of the city, Chicago extends the hand of good-fellowship and a most heartfelt greeting. We have greatly desired your presence, and while we shall enjoy your sojourn with us we will be but too glad to know that you may have pleasure in friendships renewed and new acquaintances formed. We wish you to see what we are doing in our offices—what we are accomplishing and how, and to receive your friendly criticism and advice. We wish you to see what we are doing in our several dental schools, what and how we are teaching, and to learn from your counsel how to mend our ways of work for the future; hoping meanwhile that you will also find in your review of these matters much that will be of interest to you, and when you part from us to return to your homes it will be with the feeling that it has been good for you to have been here. We have also wished to see you socially, to meet you as men, to shake your hand and spend the hours of leisure in social chat. From every side we bid you welcome.

The immediate and ostensible object of our coming together is the clinic, and it is with the clinic especially that I am expected to deal in what I shall say to you to-day. Much might possibly be said as to the general management of clinics for the development of the greatest amount of good, but I shall pass over that and confine myself for the most part to the more recent developments in filling teeth.

to each other and to the immediately surrounding soft parts; to the physical characters of the teeth themselves and their ability to withstand stress; to the nature of caries and to its causation, a subject upon which demonstrated knowledge has very recently been gained, and try to point out the relation of these to every-day procedures in filling teeth.

The teeth as they stand in the mouth in normal position form an unbroken arch by their proximate surfaces resting against each other; now it is to the nature of this contact of tooth against tooth in its relation to the soft tissues that I wish to first direct your attention—not as a new point, for I and others have discussed it before—but rather to point out anew and for further discussion its intrinsic relation to technical procedures for the arrest of caries and the protection of the related soft parts. In the well-formed dental arch this contact of the teeth one with another is similar to the contact of two marbles when brought together. So long as they have not been flattened by wear, the points of contact are very small and easily slide more or less upon each other with the motion of the teeth in their sockets. Immediately to the gingival of this contact the surfaces of the teeth begin to stand apart and the space increases until the alveolar process is reached, forming a V-shaped space between the tooth surfaces, which in normal conditions is filled with the soft gum-tissues. This is the interproximate space. This interproximate space also rounds out broadly toward both the buccal and the lingual. These I shall call the buccal and lingual *embrasures* of the interproximate space. Nature's object and evident intention in the particular form of this space is cleanliness of these surfaces of the teeth. In the chewing of food hard, brittle substances are perfectly deflected from these interproximate spaces by the forms of the surfaces guarding it, and it is only when tough, stringy foods are in process of mastication that anything passes the interproximate contact into the interproximate space. Even then such food does not remain between the contact points, because the marble-like form of this contact causes it to slip away in one direction or the other. It will either slip onward or slip fully into the interproximate space and rest upon the septum of gum-tissue. Suppose it slips into the interproximate space and hangs between the teeth. *Now it is especially this condition to which I wish to direct your attention. It is the design of the Cre-*

Possibly if each man here were asked to state what he regarded as the most important recent development in filling teeth we should receive many and varied answers. These answers would be divisible into two great classes that would reflect in a degree the peculiar mental bent of those giving them. The one class would represent the mechanical technique of filling operations, while the other would represent the mental grasp of the principles of the application of this technique. Can we justly divide these—the technique and the principles of the application of the technique? Can we give the one precedence over the other? Certainly not, and yet the constitution of human minds is such that one man is more strongly impressed and thus drawn to the one, while another is more strongly impressed with and drawn to the consideration of the other. It is especially fitting that these two classes of minds should rub against each other in a clinic like this. By so doing each will be influenced to better effort and a higher appreciation of the justly intimate blending of the two that is required for gaining the highest results in dental operations.

Filling teeth has grown to its present high state of utility by a very gradual accretion of thought upon thought in basic principles and the steady march forward of manipulative technique for the realization of each accretion of thought. As it has thus advanced in the past so will it steadily advance in the future—a little being added here, a little there—each little that experience proves to be good being cemented into its proper position in the sum of the best procedures of the time.

Most that I shall say to-day will relate to recent advance in what may be termed basic principles of the application of technique. To many of you I may not be able to offer anything that is new. Indeed, it is my intention to discuss rather that which has been known some time, but has not been known long enough for a full realization of its true bearing upon the every-day operations in filling teeth. It often happens that important principles may be known to the individual in a kind of semi-conscious way without leaving their impress upon his operations, and for this reason discussion of them time and again is necessary to their thorough diffusion through the profession at large, and especially for the apprehension of their just importance as working principles. I will call your attention to the anatomical relations of the teeth

proximate surfaces. Our literature is literally filled with these expressions and especially as affecting the proximate surfaces of the bicuspids and molars. Why has this difficulty so persistently followed the flattening of these surfaces with the file, when it has been used to gain room for filling? I answer, because of the unnatural and unhealthful forms given to the proximate surfaces. Why has this difficulty of recurrence of caries so persistently followed the so-called contouring of the teeth with cohesive gold? Again I answer, because of a lack of appreciation of the appropriate and healthful form of the contact and of the interproximate space.

This leads me almost to the point of using unusual intensives in my expression of desire to see a better appreciation of this point. I am tempted to say that the *contouring of teeth is an ignis-fatuus* that leads to the mire. *We should contour the interproximate space.* What matter if the tooth-form is not perfectly restored? The tooth-form should be held secondary to the contouring of the interproximate space. The guarding of this space is the first consideration. The form of the tooth or even its full occlusion is of less importance; though not to be neglected, it should be held as secondary. The health of the tooth and its surrounding tissues is the first consideration from any point of view that may be taken, and to this end the contour of the contact and the space comes first—form and occlusion is the important afterconsideration. So long as food wedges between the teeth, causing pain, mastication is ineffective. The patient goes lame at the table, to say nothing of disease to follow. I have been impelled to speak more at length and more strongly on this point since seeing the program of this great clinic—intended to be one of the greatest of the world. While a number propose to illustrate the contouring of teeth, not one has proposed to illustrate the contouring of the interproximate space. Hence my desire to press the point. Not as a new thing, but as a comparatively recent development of basic principle that should impress and give character and additional usefulness to each man's operations. It will not do to claim that the proper contouring of the tooth includes the contouring of the space. That is the wrong standpoint from which to view the matter. Dentists have gone on from decade to decade contouring teeth and failing to properly contour the interproximate space. I beg of you to view this matter from the vantage ground of the best defense against recurrence of caries and against disease of the soft tissues.

ator that this event should be prevented or reflected almost immediately after the occurrence, and it should be the design of the dentist in every operation upon the approximate surfaces of teeth. If we go into the study of comparative dental anatomy on this point we will find that such animals as live much upon grain and brittle foods have broad interproximate contacts, while the carnivora that live upon flesh have exceedingly narrow, even pointed contacts, that round suddenly and very freely to the buccal and lingual. The contacts are broad and flat in the horse, while buccal and lingual embrasures are broad and shallow and the contacts very narrow in the dog, thus illustrating the evidence of design.

Now, gentlemen, I commend to you another point in relation to this matter of the interproximate contact and ask of you that you take it home with you and study it at your chair while making your operations, and this is the influence of the *excursions of food over the surfaces of the teeth and gums during the act of mastication.* If you do this you will find the natural forms of the teeth of young people, before the contacts are much worn, are such that the food is directed into the lingual and buccal embrasures of the interproximate spaces and is made to drag against the declivities of the gum-septum. *In this act any stringy material that has lodged in the space is caught by food material thus dragging past and carried out of the interproximate space.* This is nature's plan of keeping these spaces clean, a plan that is fairly successful in young people before the contact points become flattened by wear.

What is the result if these forms and arrangements fail in the performance of their function? Simply that food is forced into and lodged in the interproximate space. The arch-form of the gum-septum is destroyed by the pressure of the lodged material and a pocket is formed between the teeth in which food habitually lodges and lies to be decomposed by the microorganisms of the mouth. One of two results will certainly follow sooner or later. These surfaces of the teeth will become carious, or disease of the gum-tissue slowly extending to the peridental membrane will occur, threatening the usefulness of the teeth from loosening in their sockets.

Now, what will happen if fillings in carious proximate surfaces be made without attention to these points? What has happened in past time? Review our literature and note expression after expression of the difficulties met with from recurrence of caries after filling

Dr. Miller, of Berlin, determined the classes of microorganisms producing caries of the teeth, the character of fermentation produced by them, and the particular acid which they formed. The action of this acid upon tooth-structure was also determined very accurately and the relation of microorganisms to its production within the dentin clearly shown. But the question as to how the first attacks upon the surface of firm sound enamel were made was still waiting for clear definite demonstration.

Dr. Miller has been non-committal in this point. I have been more definite in statement in some lectures before the Illinois Dental Society, in which cultures for demonstration were made, and to my classes, but have always fallen short of actual demonstration that would give the weight and influence actual certainty. I have shown that under some conditions microorganisms formed into a film or layer agglutinated together upon the surfaces of the teeth in secluded or partially secluded positions, and formed their acid products in immediate contact with the enamel, where it was definitely protected from being washed away by the saliva and thus left free to exert its decalcifying power on that tissue. I have shown the formation of this agglutinating substance in artificial cultures, as many here today will remember.

Now Dr. Williams has found the means of showing all of this as it occurs under natural conditions in the human mouth, together with the immediate effects upon the enamel. By the use of certain hardening fluids he has devised, this film of microorganisms in the gelatinous matrix formed by them has been rendered sufficiently hard to be ground down upon a stone with the enamel to which it clings, forming sections so thin that both the microorganisms and the enamel-rods come clearly into view, together with the immediate effects upon the enamel-tissue. This effect of the acid products of the microorganisms is much like that which has been described by myself from other modes of examination. That is, it is found to consist in the first instance in the solution of the cement substance by which the enamel-rods are held together, and finally the much slower solution of the rods themselves and the gradual breaking up of the tissue.

But Dr. Williams' demonstration shows a power of penetration of the acid products of microorganisms, when covered in by these films upon tooth surfaces, for which I was wholly unprepared. Among

In my practice I no longer hesitate to remove the otherwise most perfect filling if I find it failing to protect the interproximate space, provided of course I cannot cure the fault without removal, no matter whether I have made the filling or one of my fellow-practitioners has made it. I cure this trouble at all hazards, and let me say that there is no operation that I undertake for which I have more grateful expressions of appreciation from patients. Yes, I go still farther—when flattening of the contacts from wear occurs in middle-aged people and they begin to have trouble from lodgments of food, I do not hesitate to cut cavities in perfectly sound teeth and fill. In this operation I avert a threatened danger of serious character while removing a present inconvenience to the patient.

RELATION OF OPERATIONS UPON PROXIMATE SURFACES TO THE ACTIVE CAUSES OF CARIES.

In all filling operations upon proximate surfaces the operator should have a broad mental grasp of the nature of the active cause of caries and its mode of aggressive attack. Very recently demonstrated knowledge of this has been materially advanced by the work of Dr. J. L. Williams, of London. I met Dr. Williams in New York last month and had the opportunity of a long conference with him, together with an examination of his slides, besides hearing his paper before the Odontological Society and seeing his photomicrographs projected upon the screen. In reference to caries of enamel, and especially as to the methods of attack in the first inception of the carious process, Dr. Williams has furnished evidence of the most trustworthy and positive character, which adds very materially to demonstrated knowledge. While this knowledge proves not to be very different from what I and others have been teaching for a number of years, it is a demonstration of truth so clear and unmistakable as to constitute new knowledge of the subject of the most important character.

As far back as 1838 Robertson pointed out that caries must be caused by acids produced by decomposition at the immediate point where caries occurs. But Robertson could not explain how these acids were formed. He could only point out that they were certainly formed from noting that their effects were confined to a small portion of tooth-surface in positions favoring lodgments and decompositions. It required half a century of study and experimental research before the formation of acids as a product of decompositions by germs was rendered fairly clear by Pasteur. Finally, in 1882–4

his ground specimens there are several showing the penetration of the entire thickness of the enamel and a spreading of the effect well into the dentin without the displacement of a single enamel-prism. An exploring instrument might be passed over the surface of the enamel without the detection of any break in the continuity of the surface, and yet the sections show beyond the possibility of mistake widespread softening of the tissue. The extent of this was the point which particularly arrested my attention. The effect in the enamel was distinctly the solution of the cement substance between the rods, causing these rods to stand distinctly apart. In some the whole thickness was thus affected before any rods fell away, and in others the surface ends of the rods had begun to be broken up before the whole thickness of the enamel had been penetrated. In still others only the outer portion of the enamel had been affected, and over these outer ends of the rods was the film of agglutinated microorganisms covering it all in and effectually preventing the dissipation of the acid formed by saliva currents in the mouth.

It was curious to note how this effect is confined to portions of enamel the surface of which is covered by the film of microorganisms. So constant is this that Dr. Williams is of the opinion that the beginning of caries occurs in no other way. In other words, acid saliva has no influence in causing the beginning of caries. Acids distributed in the saliva have no influence in causing caries. It is solely acids produced beneath these films of microorganisms, and protected from dissipation into the saliva by these films, that are responsible for the beginnings of caries. After a breach is once established and a haven formed for the protection of growths of microorganisms, or after the penetration of the organisms into the tissues of the tooth, the carious process is not only assured but is more rapid. All of that has been sufficiently demonstrated by Dr. Miller and has become well known.

The application of this to the management of proximate surface fillings is now the important consideration. This means cleanliness of surfaces for the purpose of prevention of recurrence of decay. How can this be effected in the highest degree? We have been unable to effect this by means of antiseptic washes or artificial cleaning. The danger line is found to extend to the portions of tooth-surfaces lying well in the buccal and lingual embrasures of the interproximate space, where they fail to be regularly cleaned by the excursions of

food during mastication. The portions of the proximate surface replaced by the gold filling are safe from caries, for the reason that the gold is not acted upon, but the cavity-margins constitute a line of danger. Therefore, in the formation of the cavity for filling, cut to the buccal and to the lingual sufficiently to place the line of margin in position to be habitually cleaned by the scrubbing caused by the excursions of food during mastication. This is essentially what I have in a previous paper before the Illinois State Dental Society, and in the articles in the *Cosmos* of 1891, demonstrated *extension for prevention.*

Of course there will be failures from imperfect manipulation and other causes, but the application of these principles carried out by a steady hand trained to a high degree of skill in the present technique of filling operations will give the operator few causes for chagrin in the way of recurrence of caries of the proximate surfaces.

Dr. Williams also brings us important data with reference to the comparative liability of classes of teeth to caries, and to the influence of imperfect formation of enamel upon the liability of teeth to succumb to the carious process. In this study he seems to have recognized, as most others have done, that roughness or irregularities of surfaces, pits, deep grooves and fissures give opportunity for caries by furnishing convenient points of lodgment for microorganisms. But Dr. Williams seems to have been led to the conclusion that beyond this the conditions which determine attacks by caries are something apart from the teeth themselves. The predisposing cause is not found in the teeth but in their environment. It is not in the composition or condition of tooth-structure. On this point Dr. Williams seems to have worked long, earnestly, and very voluminously, and without any knowledge whatever of my own work in that direction. The plans of this work are also entirely different from my own. In this work Dr. Williams has obtained teeth fresh from the mouth, with the history of the patient as to caries or immunity from caries, and has made microscopic examination of the enamel of these teeth to determine the degree of perfection or imperfection of structure. These examinations have given very striking results. In order to appreciate this you should know that Dr. Williams has become remarkably skillful in grinding sections of enamel. So skillful that he seems to be able to reduce it to the thickness of a single layer of enamel-rods and yet preserve the section intact, a skill that has

been attained only by long and careful technical study. He has therefore been able to study the structure very minutely. In this mode of study that which he regards as the highest type of perfection of enamel is not found continuously. Indeed, most specimens are found faulty in some particulars. The most persistent imperfection is what Dr. Williams regards as a partial failure of the cement substance which unites the rods together. This is in the quality of the material or in some instances apparently an insufficient amount of it, so that the union of the rods remains in some degree imperfect. This latter produces the white spots often seen in enamel.

In the study of teeth carious and not carious, Dr. Williams seems to have been struck with the fact that the carious teeth were not necessarily those of imperfect enamel. Indeed, after studying some hundreds of cases the conclusion reached is that this factor has no practical relation to the occurrence or non-occurrence of caries. He finds the most perfect enamel will not withstand the attacks of microorganisms once a solid film is formed upon its surface, while the least perfect is not attacked without the presence of such protecting film. In support of this he cites instances of complete immunity from caries in which teeth have been lost from disease of the peridental membrane from the age of 36 to about 60, in which the enamel of the teeth proved to be of very inferior quality. In following out this subject the teeth of many animals never known to suffer from caries have been examined and the enamel has been found generally less perfect than the enamel of the teeth of man.

After this exhaustive study of the conditions of the occurrence of caries, a study occupying more than ten years of continuous research, Dr. Williams arrives at a conclusion which seems to be the same in effect as my own conclusions, obtained by totally different methods, and published in the *Cosmos* in 1895. These conclusions have been found by each independently and each without a knowledge of the work of the other. Dr. Williams and myself had held no conference nor seen each other for eleven years until I met him in New York.

These conclusions are substantially:—That the structure of the teeth is not a factor in their liability to caries, further than that pits, grooves, fissures and roughness of surfaces give opportunity by inviting lodgment and facilitating the growth of microorganisms at particular points; that the predisposition to caries is to be found in the environment of the teeth; that this predisposition is some condi-

tion of the secretions or fluids of the mouth which renders the active cause of caries (microorganisms) effective in its production.

The question of hard teeth and soft teeth has been found to have no relation whatever to the occurrence of caries. The hardest teeth and those with the most perfect enamel seem as likely to become carious as those less dense and less perfect in the structure of the enamel.

These conclusions have no reference to whether or not teeth with imperfect enamel or of least dense structure will decay more rapidly when the predisposition to caries is present, but it has been noted particularly that teeth with the most perfect enamel and of the densest structure decay very rapidly when the predisposition to caries has rendered the exciting cause active.

In all of those cases in which the teeth seem to have improved in quality or depreciated in quality, the change of condition has not been in the teeth themselves, but a change has occurred in their environment—in the secretions and fluids—which has affected the active agents producing caries; in the one case tending to immunity and in the other increasing its activity.

The particular conditions of the secretions constituting a predisposition to caries or inducing immunity from caries are as yet unknown.

These considerations and conclusions are of the utmost importance in filling operations. We have the assurance that however soft teeth may appear to cutting instruments, they have sufficient strength for any reasonable filling operations. Whenever the predisposition to caries is found to be strong this fact calls for the exercise of the utmost diligence and care in planning the defense of the teeth, and especially of laying out the lines of the enamel margins of cavities in such positions that they will be well cleaned by the excursions of food over them during mastication. For this purpose the buccal and lingual enamel margins of proximate surfaces should be carried well out from the contact point and the form of the occlusal surface so shaped as to direct the excursions of food well into the buccal and lingual embrasures of the interproximate space to facilitate the continuous cleaning of these margins. Such portions of the enamel margins of proximate surfaces as cannot be so laid as to receive this natural cleaning, as the gingival margins, should be so placed as to be protected by the free margins of the gums. The

fact that caries does not begin upon the portions of the necks of the teeth covered by the healthy free margin of the gum seems to me to be well established by observation; but it does begin in such position in some of the pathological conditions of the gum-margin, and is often found to make its beginnings close against the gingival line when the proper guards of the interproximate space have been destroyed either by extraordinary wear or by mutilation at the hands of the dentist. The reasons calling for this especial care are—first, all portions of proximate surfaces lying within the interproximate spaces are in especial danger when the predisposition to caries is strong. This danger area includes the breadth not cleaned by the excursions of food. If this danger area is cut away at once and protected by the filling the opportunity for recurrence is removed. Second, with the best technique of our time the margins of fillings must still be regarded as danger lines, and in all cases of unusual or even ordinary intensity of predisposition to caries should be so laid as to receive the best possible cleaning by the excursions of food during mastication. The opportunity for the growth of films of micro-organisms upon the lines of the enamel margins should be reduced to the lowest possible point. In laying these plans it must not be overlooked that the seating of the filling must be sufficiently broad and flat that the filling may easily bear the great stress that may come upon it. No fear need be felt for the strength of the tissue of the tooth, for whether gold or amalgam be chosen as the filling material, the tooth structure will not be first to yield to stress. When these points are skillfully observed and the mechanical technique is carried out with a careful hand well skilled in the art as known to-day, not many cases will return to chagrin the operator.

Further, intensity of predisposition to caries is not constant. This condition is most likely to occur in youth, and when treated with vigorous care will materially abate in 95 per cent of cases, while not a few become wholly immune. Some of those who have been my patients for twenty or twenty-five years, who in their youth presented intense predisposition to caries, have become immune later and have presented but slight relapses. Among those who have remained under my observation caries has not remained continuously active in a dozen cases. These facts should give courage in the struggle with these ugly cases; should call out our best effort; should bring into play the highest form of mechanical technique with the

best of material—so far as may be at all practicable it should be gold and gold only. What we may be able to do with improved amalgams in the future remains for test of trial. My experience with amalgam in the past condemns it in all cases when the predisposition to caries is intense, and generally for young people. In the few cavities occurring in cases of low intensity of the predisposition to caries any tyro may succeed. It is the bad cases that call for wise planning and skillful technique.

And now, gentlemen, I place these matters before you for your consideration and discussion, hoping that you will speak your mind without reserve or hesitation, remembering only that you are speaking for the benefit of humanity—that you are speaking to the end that dentists may serve suffering mankind with more zeal, greater wisdom and improved technique.

A CURIOUS MALFORMED MOLAR.

By J. M. Sprinkle, D.D.S., Nokomis, Ill.

Thinking that it might interest the readers of the Digest, I send the history of a curious malformation which occurred in my practice some months ago.

Mrs. W., 60 years of age, a resident of this place, came to me suffering with the toothache. While the pain could not be definitely located, manifesting itself in the left side of her face, a left upper second molar was thought to be the cause of the trouble. As it was the only tooth in the upper jaw, and somewhat decayed, I thought it best to extract. The tooth was in its proper position and gave no evidence of being irrregular in any way, but when it was extracted, which was accomplished only after the removal of a small portion of the alveolar arch, the third molar was found to be firmly attached to the buccal roots of the second molar, leaving the lingual root free.

SOME POINTS ABOUT ARTIFICIAL PALATES.

By Oscar Boort, D.D.S., Tabor, Iowa.

In the construction of artificial palates it should always be borne in mind that the levator palati muscles are fully developed and in active operation. The cleft is the result of arrested development of the naso-pharyngeal valve and the palate bones, more or less extensive. Movement of the levator muscles takes place in the act of deglutition and articulation, the same as in the normal velum. At every nasal tone the levators drop, and with every attempt at throat or chest tones they rise, as though never weary of performing a useless task. Every successful effort to correct the defect with a mechanical appliance must comprehend these facts, and be so constructed that the levator muscles can take hold of and move it when they move.

With this clearly in mind it will at once be seen that a substance like elastic rubber will in nowise answer the requirements in an artificial velum; instead of being moved up and down its edges curl up and the levators have no control over it; besides, elastic rubber in the mouth soon deteriorates and becomes filthy. Whatever the substance used in artificial vela it should be hard and capable of taking a high polish. The velum must be light and so formed as to lie between and over the levator palati muscles, and so attached to the supporting plate that it will swing freely from its posterior border, and be constrained by a delicate spring in such a manner as to easily yield to the muscular action and be returned to its normal position when the muscles are at rest.

In gold alone, or in gold and hard rubber combined, may be found the proper materials for such work. To make the velum sufficiently light, whether of hard rubber or gold, it must be made hollow. Usually a congenital cleft is not less extensive than an entire bifurcation of the soft palate, but occasionally the cleft does not reach the border of the palate bones. In such a case it will be necessary to use the lance and carry the bifurcation forward in the median line to the posterior border of the palate bones, in order to make room for the appliance.

Congenital clefts are uniform in character and vary only in extent, but accidental lesions of the palate are irregular in character and must be treated accordingly. When disease, such as syphilis, has destroyed the velum and left the levator muscles untouched, no matter how extensive its ravages in other parts, speech may be

restored the same as in congenital cleft, with the advantage that the restoration will be complete and perfect at once, while in the congenital cleft practice alone will lead to perfection. The artificial velum, in a case of syphilitic cleft, should always be made of a non-corrosive metal like gold or platinum, since rubber is liable to irritate the parts by keeping them unnaturally heated.

If the levator muscles are destroyed of course no movable velum can be supplied; yet great benefit to speech will be obtained by extending the plate back just far enough that in the act of deglutition the superior constrictor of the pharynx will meet and touch it.

A SIMPLE REGULATING APPLIANCE.

By Geo. M. Cameron, D.D.S., Chicago.

The average regulating appliance as offered in our journals is no doubt the result of much patient labor and experiment, and in the hands of the inventor or a skilled crown and bridge worker, with a complete laboratory, is his ideal. But as there are others who are not prepared for that class of work and probably are not familiar with this serviceable "old timer," I will, to explain it fully, give a case in practice.

A girl, aged 13, presented with the superior incisors close inside the inferior. I took full upper impression in modeling compound, trimmed out or enlarged molars and bicuspids, filled and separated. Waxed up model, extending over molars and bicuspids and to cutting edge of incisors, building up level with latter and extending back at same level for one-quarter of an inch. Placed wax in mouth and had patient bite, leaving room for incisors to clear; removed wax, put on hooded flask vulcanizer and finished. Then drilled seats or openings, one for each tooth, to be moved in plate as near center of point of contact as possible, being careful to have seat deeper than its diameter. From a large piece of Sea Tangle Tent (any druggist can furnish it) made plugs to fit the holes bored and drove in firmly, cutting off close with a wedge-cutter. Then inserted plate and changed plugs every day for five days, making them a trifle longer each time. On sixth day teeth seemed to be moving too rapidly, so put in plugs of orange-wood of length sufficient to hold to position gained and dismissed for three days. At end of that time, the conditions being favorable, continued with the

plugs of sea tent for five days more, changing daily as before. Then, having obtained the desired positions, put in orange-wood plugs as before and dismissed for a week; at the expiration of which period removed plate and dismissed patient.

The teeth were not sore at any time and the only inconvenience suffered was occasioned by difficulty in masticating solid food, the grinding surface being limited to the contact between lower molars and plate. The plate can be removed at any time, but I think a thorough cleansing when changing the plugs is sufficient, except during time plugs of hardwood are used, when the patient can remove plate once daily, but only long enough to clean.

In the above case a returning plate was not necessary, and one is seldom required in the class of cases to which this method applies.

FUNCTION OF THE TONSILS.—Dr. Fox thinks their function is connected with the reabsorption of the surplus saliva, and it is suggested that these glands absorb the poison of scarlet fever, diphtheria, etc., from the saliva. The poison of a common tonsilitis has little more than a local effect; that of a scarlatinal tonsilitis is able to reproduce itself in the system indefinitely without deterioration.—*Dominion Journal.*

HONEY BEE SECRETES FORMIC ACID.—A fact which is interesting, and perhaps new to many, is that the honey bee after filling a cell with honey and covering it with the lid, adds to the honey a drop of formic acid. This is done by piercing the lid with the sting and depositing a drop of the poison from her sack. By numerous experiments it has been shown that formic acid added to honey or any sugar solution prevents fermentation. Evidently the sting of the bee has a use besides that of defence.—*Am. Microsc. Jour.*

CHLORID OF SODIUM FOR DECIDUOUS TEETH.—While I was on my vacation this summer in one of the little cities outside of Paris, at the meeting of the French Dental Association, a gentleman presented at least half a dozen children whose baby teeth he had been treating with a saturated solution of nitrate of silver, with this addition: After he had the cavity thoroughly dry he would rub the nitrate of silver in and then fill the cavity with chlorid of sodium, rubbing it in with a wooden burnisher. He had been doing that for fifteen or sixteen years. I asked him why, and he said it formed an insoluble coating over the decayed part of the tooth. Other dentists there had been using the very same method. I speak of it because some of the dentists may try it. I have tried it since my return and shall continue to do so. Dr. Michaels and some other eminent men in France have had great success with it. The salt formed a precipitate, chlorid of silver, which they claimed was insoluble.—*W. W. Walker, in Cosmos.*

Digests.

CONGENITAL TEETH. By Dr. E. S. McKee, Cincinnati. These cases are of very rare occurrence and serve as a curiosity for doctors and students. Some writers claim that no milk teeth will appear to fill the vacancy left by exfoliation. Inheritance is shown in some cases. In the instance of Mattei, the infant's mother had been born with a tooth, and in Limerick's the mother had two congenital teeth, as did also her second child and a child of her sister.

The premature eruption of the teeth is considered to be due to some abnormal development of the bone; probably most cases have some connection with rickets. In some children who cut their teeth young the fontanelles close early, but not so in those cases where the teeth are congenital. The enamel is usually very thin or absent. The etiology of congenital teeth is described by some authors as the premature occurrence of the processes which normally lead to the cutting of the milk teeth. In a few cases it is probably due to a true estropia of the dental follicles and its teeth. Such premature eruptions are usually found in children suffering from improper nutrition or other abnormal systemic conditions.

Treatment. A tooth dangling uselessly and aimlessly in the mouth should unquestionably be removed. Otherwise inaction is preferable. The teeth are sometimes so situated as to prevent closure of the mouth, or to make nursing painful and futile and to endanger the nourishment or life of the child. The danger of hemorrhage is probably magnified by Magitot, who, having lost one child in whom hemorrhage recurred on four separate occasions and proved fatal despite all treatment, lays down the rule never to extract the teeth. If the child is puny and delicate, perhaps syphilitic, hemorrhages are possible.—*Medical Standard, January, 1897.*

* * *

SUCCESS OF THE VIENNA TREATMENT IN EFFECTING THE PASSAGE OF A SET OF FALSE TEETH. By Henry L. Williams, M.D. On returning to the Howard Hospital on the night of July 18, 1896, an officer of the Salvation Army was found waiting in the dispensary in much alarm because he had swallowed his false teeth. The history elicited was as follows:

The patient had been addressing a meeting of the Salvation Army during the evening. At the end of his address he had taken a glass of ice water, thrown back his head and started to drink. With the first swallow he felt the plate which he wore pass back into his throat. He made every effort to dislodge it by coughing and retching, but without result. Becoming frightened, he then ran into the adjoining room, where his wife was in waiting. She was informed of the situation in a word, and immediately pounded him vigorously on the back between the shoulder-blades. Within a few seconds he felt the teeth begin to pass down the esophagus, with a sensation of scraping, followed by a feeling of entire relief. He then went into the office of a physician close at hand, and was given two large pieces of raw apple to swallow in order to render certain the fact that the foreign body had passed into the stomach and was not lodged at any point in the esophagus. These he swallowed without difficulty. He was then referred to this hospital, and came at once.

The plate (upper) was described as containing the two central incisors and the left first molar, and having at each end a small metal "hook" which clasped the base of the adjacent tooth and held it in position. Accurate measurements were subsequently taken from the plate, as follows: The greatest length from tip to tip was 1¾ inches; the greatest width three-fourths of an inch. The hook which partly encircled the base of the left second bicuspid was made of hardened gold, rather slender and delicate, and projected one-quarter of an inch from the plate. The hook upon the right side, also of gold, clasped the base of the right cuspid tooth; this was likewise slender and rather sharp, but projected only one-eighth of an inch.

It was carefully explained to the patient that it was quite likely such a body would not pass the pylorus; that in case it did pass, the danger of its becoming caught at some portion of the intestinal tract and causing obstruction or perforation, with fatal consequences, was very great. The man was strongly advised to remain quietly in the hospital during the night, and await the visit of the surgical chief in the morning. This he declined to do. He also refused to take an emetic which was proposed with the hope that the body which had been swallowed might be ejected and thus all further danger eliminated. He then said that he would go home and just trust in the Lord, and, in case any symptoms developed,

would at once return to the hospital. I endeavored to show him that if he neglected any measures that might aid in preserving his safety it would be most foolhardy, and advice was given him to at once drink copiously of lukewarm water and mustard, and to eat only mashed potatoes for the next forty-eight hours.

The patient returned the next afternoon in the best of spirits with the following story: On reaching home a little before midnight he at once took a pint and a half of warm water containing a tablespoonful and a half of Coleman's mustard. This failed to nauseate him in the slightest, but served to put him to sleep almost immediately. At 2 a. m. he awoke and ate a large plate of mashed potatoes which his wife had prepared for him. He then went to sleep at once, and woke next at 9 a. m. and again ate heartily of mashed potatoes. After this he once more slept for an hour and soon after 10 o'clock dressed and lay quietly upon the lounge. Shortly before noon he felt what he described as a "scratching sensation" which he located in the left iliac fossa over the line of the sigmoid flexion of the colon, attended with an impulse to evacuate the bowels. This he did, and obtained simply a normal stool. In about ten minutes he once more felt the call from nature, and this time discharged a large mushy mass, in which the teeth were discovered. In the mass immediately surrounding the plate were found also large pieces of shaved beef, which he had eaten for supper on the previous night, and which, probably, quite as much as the potatoes, had protected and coated over the body in its passage through the intestines.—*Therapeutic Gazette, January, 1897.*

* * *

CATAPHORESIS IN TUBERCULOSIS. By N. H. Williams, M.D., Jackson, Mich. I noticed in a recent number of the *Medical Record* that a committee had been appointed by the Paris Academy of Science to investigate an alleged cure for consumption practiced by Dr. Crotte. The item briefly states that "the method comprises the use of electricity and antiseptics, the electricity being employed to open the way for the parasiticide."

This may or may not be the same idea which I have been working upon in a small way since last June. I use the continuous galvanic current and medicate the positive electrode. Having made the diagnosis and located the diseased area, I place one electrode upon the front and another upon the back of the chest, with the affected por-

tion of lung between them, using electrodes of at least six inches in diameter. Pieces of wire gauze well padded with absorbent cotton make good electrodes for the purpose. Upon the moistened cotton of the positive electrode I sprinkle a solution of iodin and iodid of potassium and use a current of about twenty milliamperes for fifteen minutes. I find that quantity is about all the patient will bear on account of the pain which comes with a stronger current. The treatments have been repeated every second day at first and at longer intervals later.

I have used the treatment in six undoubted cases of consumption, and though the time has been too short to make any positive deductions, I must say I am greatly impressed with the results obtained. Two express themselves as cured, and appear to be. The others are much improved, with the exception of one little patient, who was so frightened that the parents desisted from the treatment. Whether the results are due to cataphoresis, the iodin reaching the diseased tissue and acting as an antiseptic, or to the antiseptic effect of the continuous current, or to both, I do not pretend to say. Further experiment would determine that point.—*Medical Record, January, 1897.*

* * *

COCAIN POISONING, MAGNAN'S SYMPTOM. Rybakoff, at a meeting of the Neurological Society at Moscow, insisted on the diagnostic value of the symptom of chronic cocain poisoning described by Magnan. This is an hallucination of common sensation—the patient complains of feeling some foreign body under the skin. In some cases the foreign bodies felt were like grains of sand, in others slightly larger; generally they were described as more or less rounded, and gave rise to complaints of microbes, worms, crystals, etc., situated just under the skin. While other symptoms of chronic cocain poisoning occur also in alcoholism and with other poisons, Magnan's symptom seems to occur only with cocain. It has therefore a real diagnostic value, especially in cases where the patient is unwilling to admit having used cocain. Where cocain is extensively used in surgery and dentistry, the appearance of Magnan's symptom is a valuable indication for the immediate cessation of the drug. Korsakoff reported a case in which a woman suffering from multiple neuritis complained of "worms in the skin." On inquiry it was found that vaginal tampous containing cocain had

been freely used. The omission of these was followed by an amelioration of the symptoms.—*Neurolog. Centralblatt, August, 1896.*

* * *

ORAL SURGERY. By Edmund W. Roughton, B.S., M.D. (Lond.), F.R.C.S. Eng. Diseases of the Lips. Hypertrophy. This affects the upper lip more often than the lower. It is usually due to the irritation of cracks or fissures about the mouth and chronic nasal catarrh in strumous children. In such cases it is often known as *strumous lip*, but it may occur in congenital syphilis. The hypertrophy usually disappears as the general health improves under appropriate constitutional treatment. Sometimes it is necessary to remove a portion of the hypertrophied tissues.

Inflammatory affections. The different ones described under "stomatitis" affect the mucous aspects of the lips in common with the rest of the buccal mucous membrane, and not infrequently overflow to their cutaneous surfaces. Thus superficial ulcers similar to those occurring on the tongue and cheeks are often met with in secondary syphilis, or as the result of dyspepsia. Cracks and fissures at the red margins of the lips may be due to the same causes, or may result from exposure to cold winds, etc. If neglected they may become deep and painful, and prone to bleed when the lip is stretched in laughing, yawning, etc. They are often difficult to cure; in the first instance they should be treated with a simple ointment; if they prove obstinate they should be touched with nitrate of silver. The patient should be advised to avoid opening out the fissure by stretching his lips.

Primary syphilitic sores are not uncommon on the lips. They are caused by innoculation of some crack or excoriation on the lip with the discharge from mucous tubercles in the mouth of an infected person, or by using a drinking vessel immediately after a person with secondary syphilitic disease of the mouth. Either lip may be affected, but the upper is more commonly the site of a chancre than the lower. It is most often seen in young persons, especially females. The sore is usually raised, roughly circular, excoriated upon its surface, and discharging sanious pus, or sometimes having a tendency to scab over. The base of the sore is usually more or less indurated, but the induration is not so marked as in chancres on the genital organs. The lymphatic glands under the jaw very soon become enlarged and indurated, and symptoms of

secondary syphilis appear in due course. Primary sores on the lips sometimes simulate epithelioma. A comparison of the description thus given, with that of epithelioma given below, will suffice to show how the differential diagnosis may be made. The treatment is the same as that of syphilis acquired in the usual way.

Carbuncle of the lip is a much more severe affection than carbuncle of other parts. There is considerable doubt whether the disease is really the same. It usually affects the upper lip and begins as a vesicle or pustule surrounded by a red blush and swollen œdematous skin. The swelling rapidly extends, often involving the greater part of one side of the face. Suppuration takes place after a few days, and the skin in the central part becomes dusky, and the subcutaneous tissue breaks down into soft sloughs soaked in pus. The local sore is accompanied by severe fever and signs of septic intoxication. Death may be due to septic absorption, or to infective phlebitis of the facial vein spreading to the intracranial veins and producing meningitis or general pyemia. The disease sometimes closely resembles malignant pustule, but the black slough surrounded by vesicles and the typical bacilli characteristic of the latter disease are not found in facial carbuncle. The treatment consists in making free incisions, scraping away all the sloughs and applying strong antiseptics. The patient's strength must be supported by generous use of stimulants and fluid nourishment.

Lupus vulgaris is very common upon the face, especially the nose and the neighboring part of the cheek. It often affects the lips, especially the upper. It is a form of tuberculosis, its distinctive feature being the formation of nodules of the granulation tissue in the corium. These nodules are soft, brownish-red and translucent, resembling apple jelly. They are at first buried in the skin, appearing as small red papules on the surface. The papules gradually become larger, and the skin between them thickened and reddened by inflammatory infiltration. The patch thus formed may slowly undergo involution, leaving a smooth, firm scar not unlike that of a burn. In the majority of cases, however, ulceration takes place sooner or later, producing a granular sore covered with greenish-black crusts, and surrounded by apple-jelly nodules in various stages of development and disintegration. The disease may extend from the lips to the inside of the mouth, involving the gums, palate

and tongue. The lips may become adherent to the gums, and to some extent to each other at the angles of the mouth, thus considerably diminishing its size.

The treatment consists in a complete removal or destruction of the diseased tissue by the application of caustics and the use of Volkmann's spoon.

Tumors. *Cysts* frequently occur on the lips; they are due to distention of mucous follicles. They form small, tense, globular, semi-translucent, bluish pink swellings, containing a glairy fluid. They should be dissected out, as they are apt to refill if they are simply incised.

Nævi are not uncommon. They may be recognized by their characteristic appearance and congenital origin. When small they may be touched with nitric acid or ethylate of sodium; when large and projecting on the mucous aspect of the lip they may be ligatured; when involving the whole thickness of the lip they may be dealt with by electrolysis or excision.

Adenomata occur in the lip as small globular elastic swellings projecting under the mucous membrane or sometimes under the skin. They are composed of glandular tissue resembling that of the glands found in the mucous membrane of the lips; sometimes however they contain nodules of cartilage. They may be easily shelled out through an incision through the mucous membrane.

Papillomata are common on the lip; they sometimes form horn-like projections. They should be extirpated with the knife, as they have a tendency to become epithelimatous.

Epithelioma nearly always affects the lower lip and occurs in men, being most frequently caused by the irritation of a short clay pipe. It begins as a small crack, ulcer or indurated tubercle, which may spread superficially along the margin of the lip or deeply into its substance. Eventually it forms a large mass involving the whole lip and adjoining parts, including even the lower jaw; its surface is ulcerated and has hard, sinuous and everted edges and a widely indurated base. The glands under the jaw become infiltrated, but not as a rule until the disease has lasted some six or nine months. Dissemination through the internal organs is rare. The treatment consists in early and free excision. This is usually best accomplished by a V-shaped incision, the margins of which are subsequently brought together with hair-lip pins and twisted sutures.

The diseased glands in the neck should be removed at the same time. Sometimes it is necessary to remove a portion of the lower jaw as well. The results of the operation are extremely good as compared with those for extirpation of malignant disease inside the mouth. If removed early the disease may be completely and permanently cured. When recurrence does take place it is more often in the glands of the neck than in the scar.

Rodent ulcer occurs in old people, mostly over 50, and is twice as common in men as in women. It begins as a small papule or tubercle usually near the inner canthus of the eye, but occasionally on the lips or chin. After some time, perhaps years, the tubercle becomes a small ulcer with irregular sinuous edges, a depressed, pale pink, glazed surface devoid of granulation but often covered with a scab, and a slightly indurated base. The ulcer slowly spreads, although in places and at times it makes feeble attempts to cicatrize; thus after many years the greater part of the face may be converted into a large and ghastly chasm. The disease is closely allied to epithelioma, but differs from it in that the epithelial growths start from the hair follicles and sebaceous glands instead of from the surface epithelium, and that the epithelial cells are smaller and rounder and not so often or so distinctly grouped into cell nests. It is also much less malignant, its course being slower, and it having no tendency to infiltrate lymphatic glands or to disseminate in the internal organs. It does not recur after complete removal. The treatment consists in freely removing the disease with the knife, and the application of caustics to what cannot be thus removed.

Disease of the cheek.—The chief surgical affections met with in the cheeks are abscesses (either strumous or secondary to dental trouble), primary syphilitic sores, tertiary syphilitic ulcers, the different inflammatory affections described under "stomatitis," mucous and sebaceous cysts, lupus, epithelioma and rodent ulcer. Most of these affections are so much like those affecting the lips that a separate description is unnecessary, but the conditions described in the following paragraph deserve notice.

Salivary Fistula.—This results from the wound of Stenson's duct. It consists of a small opening on the cheek from which saliva dribbles during mastication. The treatment consists in restoring the continuity of the duct and providing a free opening for it into the

mouth, and then if the fistula does not heal, closing it by a plastic operation.—*British Journal of Dental Science, January, 1897.*

* * *

WHAT A DENTIST SHOULD DO IN CASES OF POISONING. By C. W. Glassington, M.R.C.S., Edin. 1. Send for medical assistance, saying, if possible, what the patient has taken or what has been administered. 2. If in doubt as to what poison has been taken, give an emetic of mustard and water, or a hypodermic injection of apomorphin. 3. Refer to the following poisons and their antidotes:

Aconite.—1. Stomach tube. 2. Emetics of mustard and water, sulphite of zinc, or apomorphin. 3. Stimulants. 4. Recumbent position. 5. Inhalation of nitrite of amyl. 6. Artificial respiration.

Ammonia (Strong Solution of).—1. Vinegar and water, lemon or orange juice, dilute acetic acid in water. 2. Demulcent drinks.

Arsenic.—1. Stomach tube. 2. Emetics of mustard and water, or apomorphin. 3. Magnesia in large quantities or dialysed iron (1 ounce). 4. Stimulants.

Carbolic Acid and Creasote.—1. Stomach tube. 2. Emetics of apomorphin or mustard and water. 3. Epsom salts or Glauber's salts, one-half ounce in one-half pint of water. 4. Olive oil. 5. Inhalations of nitrite of amyl.

Caustic Potash and Caustic Soda.—1. Vinegar and water, lemon or orange juice. 2. Olive oil freely. 3. Demulcent drinks.

Chromic Acid.—1. Emetics. 2. Stomach tube. 3. Chalk and milk. 4. Demulcent drinks.

Cocain.—1. Inhalations of nitrite of amyl. 2. Stimulants. 3. Hypodermic injection of ether.

Copper (Sulphate of).—1. Stomach tube. 2. Emetics. 3. Milk and eggs *ad lib.*

Ethyl Chlorid.—1. Fresh air. 2. Stimulants. 3. Artificial respiration.

Hydrochloric, Nitric and Sulphuric Acids.—1. Soap and water. 2. Any alkali. 3. Olive oil. 4. Milk and egg. 5. Hypodermic injection of morphin (stomach pump not to be used).

Iodin.—1. Stomach tube. 2. Emetics. 3. Starch and water. 4. Inhalations of nitrite of amyl.

Nitrite of Silver.—1. Common salt and water freely. 2. Emetics. 3. Demulcents.

Nitrite of Amyl.—1. Fresh air. 2. Recumbent position. 3. Artificial respiration.

Opium.—1. Stomach tube. 2. Emetics. 3. Keep patient moving about. 4. Cold douches. 5. Inhalations of nitrite of amyl. 6. Artificial respiration.

Oxalic Acid.—1. Alkalies, such as chalk, lime of whiting. 2. Castor oil.

Perchloride of Mercury.—1. Stomach tube. 2. Emetics. 3. White of egg (unboiled). 4. Stimulants.

ANESTHETICS. *Nitrous Oxid Gas.*—1. Pull the tongue forward. 2. Fresh air. 3. Nitrite of amyl. 4. Artificial respiration.

Ether.—Leave responsibility with anesthetist.

Chloroform.—Never allow it to be given for tooth extraction. If inhaled—1. Pull tongue forward. 2. Fresh air. 3. Flap chest and face with end of wet towel. 4. Artificial respiration. 5. Invert patient. 6. Nitrite of amyl. If swallowed—1. Stomach tube. 2 Emetics. 3. Nitrite of amyl. 4. Rouse patient.

HANDY EMETICS. 1. *Common Salt.*—One tablespoonful in half a pint of tepid water. 2. *Mustard.*—Two tablespoonfuls in half a pint of tepid water. 3. Put finger in the throat or irritate fauces with a feather.—*British Journal Dental Science, January, 1897.*

* * *

METAL PLATES. By L. P. Haskell, D.D.S., Chicago. There is a vast amount of injury done to the alveolar process by the retention of undue heat, owing to the non-conductibility of rubber, which I have closely observed, as I had used metal plates before its introduction. As aluminum is cheap, and makes a rigid, light, cleanly, unobjectionable plate, there is no reason why patients should wear rubber for *permanent* work. Also, a better fit and adhesion can be obtained in difficult cases than with rubber.

A plaster impression is always indispensable. It must be taken high over the cuspid eminence, as in all cases plates should be higher and the gum fuller here than elsewhere, to restore the contour of lips.

No air-chambers are needed, but as the center of palate is hard and the only portion of the upper jaw which never changes, while the process to a greater or less extent absorbs, a "relief" should be placed over the hard center to prevent at present, or in the future, rocking of the plate. This consists of a thin film of wax extending well up near the margin of ridge and the edges, chamfered thin so

as to leave no evidence of it on the plate. This is the only change I make in the model. The sides of the model should be flared so it will deliver itself readily from the mold.

The sand should be oiled, for then it can be used many times without re-oiling and so is always ready for use, and there is no danger of holes in the die from the presence of steam, as when water is used for moistening. Use a large flask for molding so as to have plenty of room for packing. This can be made of sheet-iron, four inches in diameter and three in depth.

Babbitt metal is the only alloy which has all the qualities necessary for a dental die, viz., non-shrinking; sufficiently hard not to batter; tough enough not to break, and a smooth surface. The proper formula is copper, 1 part; antimony, 2 parts; tin, 8 parts. Nothing has so simplified the fitting of metal plates as the use of this metal, as forty-five years' use has demonstrated. As pure lead cannot be poured upon Babbitt metal without danger of adhering to it, the melting temperature is reduced by the addition of tin—5 parts lead, 1 part tin. Coat the die with whiting and stir the metal until it begins to thicken, then pour quickly.

Oil the dies to prevent the metal from adhering to the plate, being careful to wipe off all traces before annealing again. Aluminum is annealed by holding over a Bunsen flame until a pine stick chars on the surface. It should be used not less than 24 gauge up to 22.

By using a loop-punch the rubber is held firmly to plate. The plate should be tried in mouth before arranging teeth, to be certain it is all right. Be sure it presses up closely at the rear so air cannot get under it. The teeth should always be arranged by the mouth, remembering that there are more failures from faulty articulation than from all other causes.—*Dominion Dental Journal, Jan., 1897.*

* * *

SUGGESTIONS. By G. Lenox Curtis, M.D., New York city. In making a diagnosis, remember that similar symptoms may indicate vastly different diseases, and that two causes may exist with apparently the same symptoms. One found, treated and cured, lessens the disease, but by no means eradicates it.

The cause of bad and offensive breath, the purulent condition of the gums, is often taken for rhinitis and treated as such, without favorable results, when, in fact, it is due to caries, abscessed teeth, antrum disease and necrosed bone. None better than the dentist is

able to diagnose such complaints, and all such patients should be sent to him for examination. His constant working in the mouth makes him master of these affections, and many a tooth which the physician condemns to the forceps would be saved if left to his judgment. I am well aware that in the country village where there is no dentist physicians are called upon to extract teeth, some doing so indiscriminately, and often, I am compelled to say, just for the fee. If the course in our medical colleges included lectures on diseases following affections of the teeth, the importance of saving them, and their bearing upon the physical health of the patient, it would be a great boon to suffering humanity, increase the usefulness of the physican, and reflect credit upon the schools. I do not mean here a course in dentistry, but the teaching of oral surgery, as the former should be left for the dental colleges. In the human economy there are no superfluous organs; all are intended to last a lifetime, and in this day, as well as in generations past, we require all our teeth for perfect mastication and for the articulation of speech. There is nothing more distorting to the contour of the face than the loss of teeth and wearing illy-designed substitutes. The physician who attempts curing indigestion, dyspepsia, anemia and the like, where there is improper mastication of food, the mouth bathed in filth from caries and abscessed teeth secreting pus, where the gums are inflamed and diseased from lack of cleanliness, is working against hope, and does both himself and his patient great injustice.

How many cases of offensive breath that obstinately resist treatment come from these sources, especially from the diseased antrum, caused by abscess from diseased teeth. The physician should as conscientiously examine the mouth of every patient when he is considering the general health, or in case of any cranial symptoms, like neuralgia, as he would take the temperature or the beat of the heart. I believe that fully 90 per cent of diseases of the face and neck are traceable to affections of the teeth. Facial neuralgia, aptly termed the "devil's disease," nearly always is due to this physical condition, being rarely ever cured from the internal application of medicine. Only recently I was called to diagnose a case of obstinate, purulent discharge from the nose, which for seven years had baffled continuous treatment from the surgeon, physician and nasal specialist. My diagnosis of double antrum disease was based on finding two abscessed teeth on either side of the mouth emptying into their

cavities. Within five minutes, by use of a trochar and canula, I was able to draw away fully two ounces of terribly offensive pus. No doubt remained as to this being the cause of her years of treatment and sickening breath.—*Dominion Dental Journal, January, 1897.*

* * *

VALUE OF STATISTICS IN CATAPHORESIS. By L. E. Custer, B.S., D.D.S., Dayton, O. The last number of this (*International*) journal contains a record of forty cataphoric operations by Dr. Louis Jack. Considerable time and care must have been given to obtain the data recorded, and while the effort is certainly commendable, we do not see that the data are of much practical benefit to other operators, or of much value in establishing rules and tables for reference for his own or the use of others operating even the same appliance, unless he can convert the number of cells and the contact points of the rheostat into volts.

The variations both in the manner and means of applying the current and in the cavity are of such wide range that it will always be difficult to obtain accurate data in these operations, and yet if we are to make a success of cataphoresis we must make these records and learn what we can from them.

By the title of the paper Dr. Jack does not intend that they should be more than notes on cataphoresis, and yet these notes could be made of great value if, instead of giving the number of cells and the pins of the rheostat, he had given the pressure in volts as measured on a standard volt-meter.

The voltage of the different cells on the market is not the same, nor does the voltage of a single cell remain the same during all its life. By the construction of a cell and its elements there may be a wide range in the voltage. A Smee or a Walker cell will produce an electrometric force of but half a volt, while a chromic acid or a Fuller cell would give two volts or four times the former. This shows that it is important to know the kind of cell being used.

Again, the chemical action going on in any given cell is not the same at all times. In some cells there is a steady voltage for a time, and then a gradual decline. This is characteristic of open circuit cells. In a dry cell there appears to be a "warming up" of the chemical process, and with it a rise in the voltage followed by a drop. At the close of the life of any cell there is always a lower voltage than when the cell was new.

The rheostat used for controlling the current is also liable to variation. This is especially true of water and graphite instruments for this purpose. Water becomes a better conductor as it heats, while all metals act in just the reverse. This property of metals, except in the case of iron, is scarcely appreciable, but with water it is somewhat marked. The form of graphite rheostat, in which this material is contained in a powdered form in a flexible receptacle, is even more uncertain than water, and those rheostats which are made of a thin coating of graphite upon slate or the like are not to be used at all unless a volt-meter is used with them.

Then, again, the conditions which pertain to the patient and the method of applying the current are important factors in securing reliable data. It was shown in a paper read before the March meeting of the Mississippi Valley Dental Society that the enamel is not a conductor of electricity; that it covers the dentin as an electrical insulator, about equal to so much porcelain. The dentin is a conductor only by virtue of the moisture contained in its tubuli, and anesthesia is produced only in the fibrils contained in those tubuli whose mouths open into the cavity. The fibrils in those tubuli covered by enamel become anesthetized only when the cocain has reached the pulp through the exposed tubuli. We might say that, except where there is a very little penetration of the current laterally at the interzonal layer, unexposed dentin can only be anesthetized reflexly. To do this the cocain must be carried entirely through the dentin and the coronal portion of the pulp be infiltrated.

Now, since the electric current, in flowing from the positive to the negative through the patient, flows through what we might call a constriction equal to the area of exposed dentin, and since no more can flow under a given pressure in volts than can pass this point, it is evident that the exposure of dentin and the distance to the pulp alone determines the current in amperes which will flow. Of course there is resistance between the pulp and the negative electrode on the cheek or hand, but that is so very small as compared to that offered by the dentin as to be negligible. A small cavity with a small area of dentin exposed under eight volts would allow, say, one-tenth milliampere to flow, while a large cavity under the same pressure would allow perhaps five-tenths milliampere. There is a distinct proportion between the area of exposed dentin and amperes under the same pressure in persons of about the same age.

The distance from the pulp—that is whether the cavity is shallow or deep—is a feature which relates more especially to the volts that may be attained than to the amperes. It will require a higher voltage in a superficial cavity than in a deep one, because the resistance is greater. This, at the same time, means that with a high voltage in a superficial cavity no more is accomplished than with a low voltage in a deep cavity, and it accounts for the length of time and often the high voltage required in this class of cavities.

That condition of dentin which has been long exposed to abrasion and is without sensation is much like enamel electrically. The tubuli have been filled in with lime-salts and it is almost a non-conductor. It is only when the deeper and sensitive layer is reached that we have the principal condition for cataphoresis—namely, conductivity. Dentin of this character will offer greater resistance than freshly exposed dentin of young persons, and this must be borne in mind in the measurement of current.

The negative electrode should always be placed at the same part of the body, because, as has been shown by Dr. Price, there is a difference of from three thousand to five thousand ohms resistance between the cathode upon the cheek and upon the hand. It is desirable to keep the voltage down, and consequently the most desirable position for this electrode is upon the cheek.

There are so many variable conditions in the operation of cataphoresis that I do not think it is possible to previously estimate with accuracy the number of volts and amperes that a given case under operation will require, and yet by the tabulation of our cases, just as Dr. Jack has done, except that standard measuring instruments be used, I believe we will, after a little experience, be able thereby to tell just when we have gone far enough with the current. We will learn just what the requirements of each case will be and can tell how nearly we are filling these requirements.—*International Dental Journal, January, 1897.*

* * *

COATING CASTS FOR VULCANITE WORK. Procure a quarter of an ounce of collodion, add to this three-quarters of an ounce of sulfuric ether, so as to thin the collodion down, and pour into the bottle containing these a package of "silver gloss." This is a preparation of tin and zinc and may be obtained of all dealers in paints, oils, etc. Though called silver gloss it contains no silver. It

If the salivary secretion is abnormal it will move sluggishly through the ducts, and the inorganic substances that are held in solution collect on the surface at the necks of the teeth.

We find in different patients different forms of tartar, varying in color from a dirty white to a black; and from a soft consistence to that of a hardness almost impenetrable. The soft brownish kind is the truest form, being composed almost entirely of constituents of saliva. The teeth themselves sometimes exhibit marked effect from the presence of salivary calculus, which forming about one portion soon involves the whole tooth, and in some cases, if not disturbed, would soon envelop the whole denture.

Such a condition as this is not only uncleanly, but it is unhealthy. It soon destroys the attachments of the tooth by its encroachment on the pericementum, causing it gradually to recede. The nutrition being cut off the tooth dies, and in time is exfoliated like any other sequestrum.

The removal of these deposits is one of the most disagreeable tasks we have to undertake, and if a little tired or in a hurry we are very apt to overlook nodules which may form an excellent starting place for more. I have had patients who had been under the care of fine operators; they showed fillings that were excellent, crowns and bridges that were perfect, yet the teeth had not been cleansed from tartar, owing, no doubt, to the unpleasantness of the operation, or to there not being enough money in it.

This idea is a wrong one, and the proper performance of this task is, I think, one of the conscientious duties we owe our profession. Our best class of patients appreciates the importance of this part of the care of their teeth, and when they are disappointed in the attention their family dentist gives them they are likely to go elsewhere. —*Dental Practitioner and Advertiser, January, 1897.*

* * *

USE OF CORUNDUM WHEEL IN THE PREPARATION OF CAVITIES. By Dr. A. Osgood, Bath, N. Y. Read at 28th annual union meeting of 6th, 7th and 8th District Societies, October 27-29, 1896. For several years past it has been my habit to make much use of the corundum wheel in the preparation of cavities for filling teeth. I will speak first of cavities on the coronal surface of the bicuspids and molars. Very frequently the wheel is the first thing I use in leveling down the surface about the orifice of cavity. After

comes put up in papers of an ounce or more, in the form of an impalpable powder. It unites to a certain extent with the collodion, when shaken, and is applied to the face of the plaster cast, as well as to the reverse of the investment in the case flasked for vulcanite work, with a camels-hair pencil, leaving a very even and thin film over these, which effectually prevents the adhesion of the vulcanite to the plaster, permitting the case to come from the flask clean. The silver gloss may be had at slight expense, enough to last for a year or more with ordinary use. It should be kept in a well-corked bottle, and the pencil cleaned after each use. Should particles of it adhere to the plate, it can be entirely eaten off by immersing in a bath of nitric acid and water—one-quarter acid, three-quarters water; but this we have not found necessary as it comes from the flask clean.—*Dental Office and Laboratory, January, 1897.*

* * *

SALIVARY CALCULUS. By Dr. Percy Greene, Belmont, N. Y. Read at 28th annual union meeting of 6th, 7th and 8th District Societies, October 27–29, 1896. The lime-like substance commonly termed tartar is found principally on the lingual surface of the lower incisors and the buccal aspect of the superior molars, and as in these locations are found the openings of the principal salivary ducts, it is inferred that these deposits, or a portion of them at least, come from that source.

We find by analysis that tartar is composed of carbonate of lime, phosphate of lime, fat, mucus, and accidental matter. The saliva from which these deposits come is a fluid secreted by three sets of glandular bodies—the parotid, the submaxillary, and the sublingual. Another fluid in connection with the saliva is composed of mucus, which in some cases, it is claimed, also assists in the formation of tartar.

The secretion of the parotid gland has a specific gravity of 1.006 and contains in solution carbonate of lime, little traces of chlorid of potassium, bicarbonate of soda, and sulpho-cyanid of potassium. The submaxillary secretion is nearly the same in composition as that of parotid, although no sulpho-cyanid of potassium is found. It presents a clear appearance, but is very tenacious. That of the sublingual is essentially the same, but shows a little larger proportion of ptyalin.

has the effect of reducing the size of the cavity, which is an advantage. This practice should obtain in all cases in which the teeth are of feeble structure. My success has been the best with this class of teeth when I have heroically used the wheel, and have given the teeth strength by reducing their weak points. The making of wide spaces between them should be avoided, and when possible the filling should be carefully contoured sufficiently to bridge over any opening that is made, but it is better to leave a space than very frail walls.

If this work is attempted with large wheels or disks of coarse grit, such as the dealers usually furnish us, it will not be properly done, besides being a very trying operation to persons that come into our hands. We should remember that a coarse corundum or carborundum wheel is a terror to all who have the usual amount of nerves, and they have the feeling that you are doing your work in a cruel manner, and it adds much to their dread of the dental engine. —*Dental Practitioner and Advertiser, January, 1897.*

* * *

LIGHT IN THE DENTAL OFFICE. By Dr. W. B. Knapp, Portland, Ore. Read at Oregon State Dental Association, August 12, 1896. The fingers will retain their cunning long after the eye has lost its accuracy, and will do good work even when the nerves have to be braced up by a mighty effort for each occasion, only to suffer a terrible relapse when the strain is over. But the eye once exhausted or seriously weakened, causes the operator's work to suffer. He does not realize that the eyes that are a little tired possibly have not only been worked harder than they should, but are no longer accurate. We are told that what we call "seeing" is the photographing of pictures on the retinal purple of the eye, whence they are conveyed by means of the optic nerve to the brain; that each of the rapidly changing pictures uses up a certain amount of this purple, which is being constantly replaced; that certain conditions, especially of light, exhaust the supply and the powers of reproduction more rapidly than others. It behooves us, then, to study well these conditions and economize our resources.

I shall not enter into those abuses of overwork, in which we are so prone as a class to indulge; such as protracted reading in the small hours of the night by the aid of strong, ill-arranged artificial light, frequently lying on our backs, favoring the tired body, but

this I use simply chisel burs and excavators until all decay is removed and the cavity is properly shaped, when it may be found advisable to use the wheel again to smooth down rough margins. This being done, a filling can be introduced that has a well defined outline, and particles of food will not be retained in the depressions which usually surround it.

The posterior depression of the superior second molar is frequently found quite deep, and if there are any indications of decay there should be a sufficient cutting down to permit the food to glide off, or we are very likely to find occasion to refill the tooth in a much shorter time than should be necessary. They are teeth that are much neglected by the brush and are prone to decay. It is good practice to anticipate caries in the locality mentioned and to make free use of the wheel to lessen the danger to which it is subject.

The third molars very frequently require an entire change of the coronal surface, and the wheel should play an important part if they are decayed. We often find the occluding surface a mass of small cones and fissures, which the wheel will greatly improve, and it should be used until no lodgment for food is left, whether the teeth are decayed or not. They are hardly ever reached by the brush and should be brought as nearly as possible to a self-cleansing condition. If the work of leveling down the enamel on the coronal surfaces of the bicuspids and molars, I mean the marginal portion surrounding the prepared cavity, is thoroughly done, when you see the effect in after years you will feel repaid for the time expended in the operation.

In preparing cavities in the incisors and cuspids I rarely use the wheels or disks, but for approximal cavities in the bicuspids and molars they are occasionally useful for separating the teeth. Usually separations are better made with either straight or bent chisels that are thin and of proper form, but if a disk is used it should be thin and of a fine grit, if it is to be done neatly and with consideration for the feelings of the patient.

In large compound proximal cavities we frequently have a sharp, weak corner, which should be removed. It may be objected that by so doing the masticating surface is lessened, but that is not of so much importance as the strengthening of the tooth by giving it a greater power of resistance. It is much better to grind off all weak corners than to leave them to be broken down sooner or later. It also

straining the equally tired eyes to their utmost endurance; the use of the microscope, that most enticing but most taxing of all pursuits, etc., but shall confine myself to effects of light in the dental office.

The dentist is eternally calling for new and stronger light, and yet it is not always that which he wants, but a little light right where he needs it. The most perfect light is that of the sun, yet how long could we endure its direct rays on a gold filling? The writer of an article in the *International* lays great stress upon the necessity of a shadow cast by the point of the instrument in all mechanical work requiring accuracy, to enable the eye to perform its functions with ease and a correct appreciation of its efforts, a point that is probably well taken.

We all recognize the difficulty of forming accurate conceptions of the distance away or size of an object when we have no landmarks by which to judge it. It is for this reason that while this writer recognizes the north light as the steadiest and in all ways the best for the artist and many professions, he suggests the south light, which will cast a stronger shadow, as the best for the dentist. Non-familiarity with the technique of our work leads him to overlook many things that would, I am certain, modify his judgment. One point of difficulty is a cavity within a cavity; a situation which would usually prevent the direct rays of light reaching the point of the instrument and so casting any shadow of it at all. The brighter the light pouring into the oral cavity, the more intense, usually, is the gloom of the cavity in the tooth.

In most mechanical pursuits and studies the light, natural or artificial, can be brought to bear directly upon the point it is desired to see. The dentist has a more complex condition to contend with. He is compelled to work fully half the time with reflected light, and not infrequently sees only a reflection of the point of operation. We all recognize how exceedingly trying this latter condition is. We also reverse, as a rule, another condition that surrounds most all who use their eyes intently—generally the point of interest is the point at which light is centered, and when the eye leaves it for a moment it is met by a condition no brighter and probably less intense, and so, to a certain extent, restful. When we look up from a dark cavity it is to be dazzled and for moments half blinded, producing, I presume, for the time chaos in the photographic plates of retinal purple.

The north light is the steadier, and, while it lacks the intensity of the direct rays of the sun, it is also minus the glare that is so trying, and is not so affected by the passing of clouds, is more even the day through, and the retinal purple will not burn up so rapidly.

The morning light is the more pervasive light of the day. I have frequently noticed quite early in the afternoon, while the light out of doors seemed unabated, that it did not seem to have the power of penetrating the oral cavity. In fact, I think most operators prefer to do their gold work in the morning.

Cross lights are not only perplexing but destructive. Particular attention should be given to the arrangement of furniture, the hanging of pictures and the color of walls, that they do not reflect light or dazzle or bewilder the eye as it is raised from the work. If there is paper on the wall, the nearer it is without distinct figures the less it will tire the eye. Some author says that the analysis of light by the spectrum demonstrates that red and yellow tints are irritating to the eye, while green and blue are restful, and anything approaching a purple is destructive. For some years I worked in a room that was covered with a paper almost gold color—bright but without a trace of gilt. The moment you entered the room the eyes seemed refreshed; it was exceedingly light and cheerful and there was a softness about it that never dazzled or irritated the eyes. As you glanced up from your work there was no reflection, yet it seemed to radiate light. I never have seen so much light in a room with so little glare. The blue and green tints absorb light; and while they are, if carefully selected, not irritating to the eye, they are depressing, and I think the light in such a room lacks the power of penetration. I should prefer a soft cream shade.

Curtains play a very important part. With a north light there is no necessity of any curtains to filter the light, simply a shade for the appearance of the window and to possibly shut off a part of the supply. This should be impenetrable. An olive green color is excellent. There should be no openings beside the curtain letting in a long stream of light to catch the eye every time it is raised. A lace curtain is a nuisance and apt to be trying. If you are now using a north light and desire to diminish the intensity of it. use a curtain as nearly as possible the color of old lace.

All artificial light is trying beyond endurance and will not be indulged in by the dentist who desires to do a far larger amount of

work by prolonging the years in which he can use his eyes. Have no artificial light arranged so that at any time the eye will catch the flame. I have not worked with a ground-glass globe over an electric light and so cannot say whether it will throw light enough into the cavity to operate by or not. In using the small incandescent lamp in the mouth be careful to have it perfectly shaded from the eye. I think that the lamp-globe might be ground to good advantage.—*Pacific Stomatological Gazette, January, 1897.*

* * *

DISINFECTANTS AND THE CHEMICO-METALLIC METHOD OF TREATING AND FILLING THE DIFFICULT ROOT-CANALS OF SEMI-DEVITALIZED TEETH. By George W. Weld, D.D.S., New York. Read before the New York Odontological Society, October 20, 1896. A true "disinfectant" is supposed to be an agent which is capable of destroying bacteria and neutralizing morbific effluvia. This definition is made in a restricted sense, for some writers include agents, embraced by the word "antiseptic," which are capable only of counteracting septic conditions of animal bodies. It has been said that the sun is one of the greatest of all disinfectants. Doubtless this is true. At the same time we are led to believe that the spores of certain bacteria are not infrequently subject to summer's heat without being destroyed or losing their virulent properties. In the strict sense of the word, a disinfectant is an agent which destroys microorganisms by chemical processes. We have considered a solution of the bichlorid of mercury a perfect disinfectant. Recent experiments, however, have shown that this chemical agent oftentimes produces a definite chemical reaction, resulting in the production of a third compound. Professor Abbott, of Philadelphia, in his experiments found "that in the reaction that is seen to take place between the salts of mercury and albuminous bodies there results a third compound, which has neither the characteristics of mercury nor of albumen, but partakes of the peculiarities of both; it is a combination of albumen and mercury, known by the indefinite term 'albuminate of mercury.' In other words, the process is not a catalytic one, that is, occurring simply as a result of the presence of the disinfecting body which is not itself destroyed in its process of destruction, but is, as said, a definite chemical reaction which takes place within more or less fixed limits; in other words, with a given amount of the disinfectant

employed, just so much work expressed in terms of disinfection can be accomplished."

The experiments of Gippert are interesting in this connection. Gippert found that a reaction took place between a solution of bichlorid of mercury and the spores of anthrax bacillus, the result being the apparent destruction of the living properties of the spores. He demonstrated, however, that this did not imply the complete death of the protoplasm of the spores, for when, by use of the sulfid of ammonium, he precipitated the mercury—that is, destroyed the combination of the spores and the mercury—he found that the protoplasm of the spores returned to its original condition.

In this connection, Professor Abbott goes on to state that it is probable that all *inorganic* bodies combine with any or all of the protoplasmic bodies, and, furthermore, that the disinfection of excreta, sputum, or blood, containing pathogenic organisms, by means of a solution of the bichlorid of mercury, is a procedure of very questionable success. Suppose we desire to disinfect the canal of a root of a tooth with a solution of bichlorid of mercury. What may be the result? Why, as soon as the energy of the solution, introduced on a piece of cotton we will say, is exhausted, and after the third compound is formed by the union of the mercury and the albuminous compounds in the root, it becomes inert—at least, as far as its disinfectant properties are concerned; and a *renewal of the same is required* just as soon as this reaction which I have alluded to takes place, which may be, and probably is, within the space of one minute.

It may be said (1) that *heat* increases the energy, and is, in fact, the best of all disinfectants. (2) That whatever disinfectant is employed, the one which is powerful enough to destroy the life of a germ is also, in quantity and time, powerful enough to destroy human life. Indeed, certain spores of certain bacilli have been known to retain their life properties after having been subjected to the heat of boiling water for a period of fifteen minutes. It was this fact, in connection with a second and third boiling (or fractional sterilization), that upset Needham's theory of spontaneous generation.

It is perhaps difficult to draw a line and state positively what agent is an antiseptic but not a disinfectant; for although it is claimed that an antiseptic is not a disinfectant and a disinfectant is

always an antiseptic, it is altogether probable that if pathogenic germs or spores were immersed for any great length of time in any of the so-called antiseptic solutions, the result would be their ultimate death.

By the word *sterilization*, in contradistinction to *disinfection*, we mean the destruction of bacteria by heat or mechanical means instead of a chemical process. There are two kinds of heat employed for this purpose, viz., dry and moist heat. Of these two, moist or steam heat is generally used in the laboratory for sterilizing all kinds of nutrient media, for the reason that sterilization is thus accomplished by a much lower temperature.

We often hear of *deodorizers* and *germicides*. A deodorizer is only an agent that destroys offensive odors—that is, the chlorid of zinc or sulfate of alumina, etc. The so-called "germicides" frequently seen in public and private lavatories are, as a rule, nothing more nor less than deodorizers. The agents employed only hide a smell; and the trickling of a small quantity of a solution of the chlorid of zinc over the bowl of a water-closet is about as effective, as far as the destruction of pathogenic germs is concerned, as so much cold water would be. Indeed, it has been observed that if germs capable of producing disease possessed an odor, and if offensive sewer gas contained germs, hiding the smell would be the best means of propagating germs and spreading disease. A *germicide* is a true disinfectant, for it is, according to the modern definition, an agent capable of killing all microorganisms.

In 1891 I read a paper before the Odontological Society of New York, entitled "The Injurious Effect of Vegetable and Mineral Acids upon the Enamel of the Human Teeth, with Some Curious Illustrations." I stated at the time that I should attempt to put the experiments in such order that they might suggest further inquiry in this special direction. After five years of thoughtful study and painstaking efforts, I believe the problem of filling the root-canals of teeth—at least the most difficult ones—has been solved, and that the *new method* which I shall introduce to you this evening will prove an aid in the preservation of the human teeth.

Of the illustrations which I have alluded to, those of you who were present at the meeting which I have mentioned will recall the simple experiment of placing a piece of zinc in strong sulfuric acid (H_2SO_4), and the acid had no effect on the structure of the zinc; but

when a little water was added the zinc was chemically destroyed; that it was the sulfate of zinc resulting from the first chemical action, insoluble in the concentrated acid, which formed a protecting coat over the surface of the zinc; the addition of water dissolved the protecting sulfate and rendered further chemical action possible. I placed a tooth in strong tincture of the chlorid of iron, containing free hydrochloric acid, and demonstrated that the enamel of the tooth was not injured. It was protected by the oxid of iron, which adhered so closely to the surface of the tooth (as the sulfate of zinc formed a protecting coat to the zinc) that immediate chemical action was impossible. I illustrated in other ways; for instance, where mechanical interference, due to a chemical action and the formation of a third compound, prevented a strong acid from chemically destroying tooth-structure. Furthermore, I demonstrated that, irrespective of any mechanical interference, the chemical destruction of tooth-structure did not depend on the *strength* of either an *organic* or *inorganic* acid.

When pure carbonate of lime, or common chalk, was immersed in strong acetic acid, on account of its vicidity chemical action was extremely slow; but when water was added the carbonate was immediately attacked and dissolved. The same thing occurred when a tooth was immersed in strong acids and simple syrup; and I repeat and emphasize, it is not the strength of acids which chemically destroys tooth-structure, but it is oftentimes a question of *solubility* or *fluidity;* water increases the destructive energy of almost all kinds of acids on the lime-salts of the teeth. There are one or two exceptions to the rule relating to the fluidity of a solution and the destructive energy of acids. When we immerse a tooth in the tincture of the chlorid of iron containing free hydrochloric acid, and dilute with alcohol instead of water, there will be formed on the surface of the enamel a compact, protecting peroxid of iron of the anhydrous form $Fe_2(OH)_6$. The following formula will show how the hydrated peroxid is formed from the anhydrous peroxid: $Fe_2O_3 3H_2O = Fe_2(OH)_6$.

The *new method* of disinfecting the difficult and so-called "inaccessible" root-canals of semi-devitalized teeth is based on the discovery and principle that a certain combination of acids will act upon a certain sensitized alloy quicker than on tooth-substance; that when such an alloy is inserted into the root of a tooth and sub-

jected to the influence of one drop of such a combination of acids, there is an immediate chemical action which results in a thorough disinfection of the canal of the root and the formation of two compounds, viz.: (1) A reaction forming an oxid which envelops the metal and serves as a permanent filling. (2) A reaction forming an albuminate after coming in contact with the albuminoid bodies, and the salts of the alloy, in the canal of the root. In other words, the animal matter in the tooth, whether putrid or otherwise, has changed its peculiarity through the influence of a definite chemical action.

Permit me to repeat one or two of these experiments, for they lead up to the nature of the acid and metal employed, and they also illustrate that it is not always the strength of an acid that chemically destroys the integrity of tooth-structure. I have in this glass some chemically pure sulfuric acid which, for reasons I have explained, is inert, so far as its destructive energy affects either the lime-salts of a tooth, the metal zinc, or the sensitized alloy. When I add a little water both metals are dissolved, the sensitized alloy being the most susceptible to chemical action, the tooth is decalcified. If I decrease the fluidity of the liquid by adding more sulfuric acid chemical action is arrested. Chemical action also commences simultaneously upon both metal and tooth, and the condition of solubility or fluidity which affects one also affects the other.

The following experiment illustrates how a strong acid quickly destroys a tooth without affecting metals: I will pour into a glass a small quantity of nitric acid, the strength of which is unchanged, although a foreign substance has been added and its color and specific gravity somewhat altered. Now, if I place in this acid a tooth the enamel is almost immediately destroyed; but when I introduce one of these sensitive metallic broaches into the same acid you will observe there is no chemical action. If I employ the tincture of the chlorid of iron containing a small quantity of free *hydrochloric acid*, the result is just the opposite, for in this case, and for reasons before stated, the tooth-structure is not affected, but the metal is slowly dissolved,

My next experiment relates to nitrohydrochloric acid or *aqua regia*, and shows how quickly a metal can be dissolved without affecting the lime-salts of a tooth. I will employ for this purpose nitric acid which has undergone a slight modification, and will add about one-third hydrochloric acid. Into this solution I will drop

a tooth with perfect enamel and a small piece of gold foil. In a short time it will be observed that the color of the solution has changed to that peculiar yellow-golden color which is characteristic of nitrohydrochloric acid in which gold has been dissolved; in fact, the gold has already commenced to dissolve. In other words, the gold will be dissolved and the enamel of the tooth will be protected; not to that degree that the tooth is protected in the strong sulfuric acid, nor in the tincture of the chlorid of iron, but protected from immediate chemical action.

The "Chemico-Metallic Method" for filling the difficult root-canals of semi-devitalized teeth presupposes no loss of tooth substance. If perchance, in some cases, the energy of the acid employed is not entirely exhausted by its greater affinity for the metallic broach, and a surplus of the acid frees an infinitesimal quantity of the lime-salts, the chemical result, in addition to the oxids produced by the action of the acid upon the metal, must be a basic carbonate and phosphate. The method presupposes that whenever a delicately-constructed steel broach can be introduced into a root-canal, whatever its length may be, whether straight or tortuous, whether it be filled with semi-devitalized matter or putrescent pulp and fetid gases, that canal can be thoroughly treated, disinfected and permanently filled within a period of five minutes. It is not claimed, however, that the method will cure an alveolar abscess, but rather to remove the cause which, in many cases, would produce an abscess. It is not claimed for the method that every root-canal can be disinfected and perfectly filled, for some root-canals will not admit the introduction of any kind of an instrument, however delicately constructed—much less a medicament. The dentist who asserts that he can accomplish such a thing, whatever method employed, and that he is never troubled with abscessed roots after *he* has treated them, makes an assertion which, in the writer's humble opinion, is pretty nearly on a par with imbecility.

The acid employed in the "Chemico-Metallic Method" is the nitro-hydrochloric acid slightly modified. In other words, nitric acid charged with chlorin; it is the chlorin which attacks the sensitized metal. The specially-prepared acid resembles carbolic acid in many respects. Both are irritant poisons and coagulate albumen. When applied to the skin or mucous membrane both produce a burning sensation and an eschar is formed. Its escharotic action, however,

is very superficial, which is probably due to its greater power to coagulate animal matter. Resembling carbolic acid, or creasote, it does not immediately destroy rubber-dam, linen fabrics, or tooth-structure. In one respect it is unlike carbolic acid—to a much greater degree a combination with the alkalies entirely checks its chemical and physiological action. It is powerful enough to kill all microorganisms that may be in the canal at the time of filling. The metal employed is composed of silver, tin and zinc. The last two metals mentioned are malleable and fairly ductile, but they both lack the necessary stability for a broach; hence a little silver is added.

The broaches are one and one-quarter inches in length, and made as stiff as possible without sacrificing affinity for the acid. They are cut off with a pair of scissors specially made for the purpose. The pair which I hold in my hand has, as you will observe, very short blades placed at right angles. Another pair with short curved blades, presented to me by Dr. Northrup, I have found useful for the purpose; but almost any pair of short and curved-bladed scissors will answer, especially if a little nick be filed in one of the blades near the point to catch and hold the metal. To facilitate the operation, cut the broach off after it is in the root only half-way; it can then be pushed in with any suitable flat-pointed instrument. I am in the habit of using, for this purpose, one of the old-fashioned inverted cone-bur instruments. Whatever shaped scissors may be employed, the blades will rapidly corrode, and can be used only for this purpose.

As heretofore stated, the method relates to difficult and "inaccessible" root-canals. Its application is particularly directed to the roots of the following teeth: (1) The anterior roots of inferior molars, where in each molar there is *one root* and *one foramen* and *two delicate hair-line canals.* (2) The roots of inferior bicuspids with one or two small canals. (3) The roots of inferior centrals and laterals. (4) The *two buccal roots* of all the superior molars. (5) The superior bicuspids, containing *two delicate canals* instead of one. (6) The superior laterals, with hair-like canals.

By way of illustration, suppose we have the anterior root of an inferior molar to fill. The posterior root having, as a rule, but one canal, offers but little, if any, difficulty to a skillful operator. But for the proper filling of the anterior root there are a number of difficulties to overcome. First, it is inaccessible; then a front view of

this root shows a thin septum of bone separating two distinct hair-like canals, from a half to three-fourths of an inch in length, which, in size, will only admit the smallest kind of a flexible steel broach. We often meet with roots such as I have described, where it is possible to insert a steel broach as far as the apical foramen, but impossible to introduce medicated cotton or properly fill with any known material. Now, in such a case, try the "*Chemico-Metallic Method.*" After properly adjusting the rubber-dam, and carefully removing all the moisture from the cavity, insert into the root-canal a fine flexible steel broach. Having ascertained the exact location, size, and length of the canal, we substitute the flexible sensitized metal; then touch the metal with one drop of the prepared acid. In two or three seconds we find that a reaction has taken place throughout the length of the root-canal. An oxid had been formed and the animal matter in the root has undergone a metamorphosis (it has become an albuminate of the sensitized alloy), and the root has been completely disinfected. (Whenever a metal is subjected to the influence of an acid, on account of chemical action, there must be a generation of gas. In the "Chemico-Metallic Method" this gas is eliminated in the pulp-cavity at the point of entrance, and with it are embraced the fetid gases contained in the root-canal. This chemical action may continue for a period of five or ten minutes. It may appear advisable then to employ a cotton dressing and gutta-percha, and postpone permanent filling of the cavity for a day or two.)

Cut off the end of the sensitized alloy and the root is disinfected and filled. But it is not necessary to leave the metal in the root. Suppose we desire to crown a root that first requires disinfecting. All we have to do is to *remove the metallic pin*, enlarge the root-canal, and adjust the crown in the usual way. Now let me illustrate the manner in which this acid and metal act on albuminoid substances. I hold in my hand the root of a cuspid with an enlarged canal. I will now substitute for the dead pulp, which might be present, but is not, a small piece of calf's liver, which is in a putrefactive state. As you will observe, I insert the alloy, which is in the form of a broach. I now touch the metal with a drop of the acid. You observe the chemical action which is produced by the acid and metal coming in contact. The reaction has already taken place; the oxid has been formed, the peculiarities

of the animal matter in the root have been changed to the extent that it is very doubtful if putrefaction can ever take place. As a further illustration, I have immersed in the acid contained in this bottle a piece of liver which happens to be that of a guinea-pig. If it were any other organ of an animal's body, however, the result would be the same. As you will observe, in appearance the character of the animal matter is entirely changed; it has been coagulated. Microscopical examination reveals the products of cellular degeneration. Whether putrefaction would ensue after the acid is removed by a thorough washing I am unable to say; but I feel safe in claiming that any small quantity of dead animal matter that may be left in the root of a tooth and then subjected to the influence of the acid, plus the salts of the metallic alloy, thereby forming an albuminate, will so change its character that putrefaction will be an impossibility.

In this connection I have prepared in a saucer a small piece of calf's liver which has been studded with the sensitized broaches and allowed to remain until it has become putrid. When I pour a small quantity of the acid upon it a fierce chemical action takes place; the chlorin attacks the metal, the fumes of nitrohydrochloric acid are thrown off, the dead animal matter is coagulated, the bacteria are destroyed, the oxids and the albuminates are formed, all odor disappears, and disinfection is accomplished. I have made a series of experiments relating to the merit of the various antiseptic solutions prepared for dentists, especially the so-called balsamic preparations, the principal ingredients of which are boric acid, oil eucalyptus, oil gaultheria, etc.

Of all the preparations ending with the syllables "in," "tin," "id," "sol," "tol," the one that ends *fine* is the one that ends with "mol." I refer to euthymol as being the best and strongest of all the balsamic solutions; for when the experiment just made is repeated, and a small quantity of euthymol is poured upon a piece of decaying liver, minus the metal points, there is less odor perceptible: and altogether it is a superior antiseptic. Any solution which hides the smell of a dead pulp is a valuable acquisition to a dental office.

The following table of experiments indicates the potency of euthymol as a germicide and antiseptic.

The gelatin plates are made by taking up a small amount of the culture of the germ on a loop of platinum wire, introducing it into

the euthymol solution contained in a test-tube, and stirring thoroughly. The platinum wire is then sterilized in the flame of a Bunsen burner. Next, a wire loop bearing a small quantity of the euthymol solution containing the germs is taken out and stirred in a tube of sterilized softened gelatin. This tube of planted (inoculated) softened gelatin is then poured out into a small sterilized flat-bottomed glass dish with glass cover, which is shaken well to distribute the gelatin over the bottom. This is allowed to stand for three days at room temperature, and then the colonies are counted. The colonies (the small whitish dots formed in the gelatin upon standing) are the progeny of each individual germ not destroyed by the euthymol.

In the first series of experiments, gelatin plates were planted with typhoid-fever germs that had been exposed to the action of 100 per cent euthymol for different periods:

Plates planted immediately after immersion of germs in euthymol.	Planted after five minutes.	Planted after ten minutes.	Planted after fift'en minutes.	Planted after thirty minutes.	Planted after sixty minutes.
Few colonies	0	0	0	0	0
Few colonies	0	0	0	0	0
Few colonies	0	0	0	0	0

Second series of experiments, 25 per cent euthymol used instead of 100 per cent:

Plates planted immediately after immersion.	Planted after five minutes.	Planted after ten minutes.	Planted after fift'en minutes.	Planted after thirty minutes.	Planted after sixty minutes.
Many colonies.....	0	0	0	0	0
Many colonies.....	2	0	0	0	0
Many colonies.....	1	0	0	0	0

Third series, 100 per cent euthymol used; sputum substituted for typhoid-fever germs:

Plates planted immediately.	Planted after five minutes.	Planted after ten minutes.	Planted after fift'en minutes.	Planted after thirty minutes.	Planted after sixty minutes.
No colonies or growth	0	0	0	0	0
No colonies or growth	0	0	0	0	0
No colonies or growth	0	0	0	0	0

Fourth series, 25 per cent euthymol used with sputum:

Plates planted immediately.	Planted after five minutes.	Planted after ten minutes.	Planted after fift'en minutes.	Planted after thirty minutes.	Planted after sixty minutes.
No colonies or growth.....	0	0	0	0	0
No colonies or growth.....	0	0	0	0	0
No colonies or growth.....	0	0	0	0	0

Fifth series, 10 per cent euthymol used with sputum:

Plates planted immediately.	Planted after five minutes.	Planted after ten minutes.	Planted after fift'en minutes.	Planted after thirty minutes.	Planted after sixty minutes.
Three colonies.....	0	0	0	0	0
0	0	0	0	0	0

Beef bouillon tubes were planted with dust, typhoid-fever and pus germs, then different percentages of euthymol added, and the tubes placed in an incubator for forty-eight hours. The following table shows the germs used, the percentage of euthymol added, and the resultant growth, if any:

Beef Bouillon Tu bes	Euthymol Added.						
	None.	75 per ct.	5 per ct.	3 per ct.	7 per ct.	11 per ct.	15 per ct.
Inoculated with ordinary dust	Infinite growth	Some growth	Slight growth	Slight growth	No growth	No growth	No growth
Inoculated with pus germs	Infinite growth	Some growth	Slight growth	Slight growth	No growth	No growth	No growth
Inoculated with typhoid germs	Infinite growth	Some growth	Slight growth	Slight growth	No growth	No growth	No growth

I will now immerse a tooth with perfect enamel in the acid (in fact, this same tooth has already been immersed in the dental acid for a period of one hour). I will leave it there for a minute or two. You will observe that when I remove it I take it up on a piece of absorbent cotton and carefully wipe it; to have it come in contact with water, even at this time, would result in a chemical action and a very serious detriment to the tooth-structure. You will observe that the enamel of the tooth has not been injured in the slightest degree. But when I place in the same acid a small piece of the sensitized alloy, you will observe what may be called a chemical explosion. If I add a little of the concentrated sulfuric acid, chemical action is arrested. And why? 1. Because I have changed its fluidity; it is now viscid in character, and protects the alloy by a mechanical interference, just as I have told you that the enamel of a tooth is protected in strong acid or with a thick syrup and acid.

2. For the reason that the surface of the alloy has probably been covered with a sulfate which is insoluble in this medium. If I add a little water, however, the protecting sulfate is dissolved and chemical action commences again, just as it did when I added a little water to sulfuric acid containing a piece of common zinc. And, for the same reasons, when I immerse a tooth in the acid there is no chemical action.

It would seem that we can accomplish by this method about all that can be accomplished, viz., eliminate the fetid gases in the root; coagulate the dead animal matter; destroy the microorganisms; form two new compounds—the oxid and the albuminate of the sensitized alloy—and, finally, disinfect and thoroughly fill the root. What more is there left for further putrefaction, and what doubt can there be concerning the "permanency of asepsis"?

There are one or two objectionable points associated with this "method." The vehicle employed for disinfection is a powerful acid, and should be protected and used as carefully and intelligently as carbolic acid or creasote. It stains the fingers, and if spilled upon the table or bracket, steel instruments will rapidly corrode and oxidize. The "method" is not intended, however, for careless operators. Accepting whatever objectionable features with which it is associated, it may be said that its possibilities, as a chemico-mechanical achievement, have been amply demonstrated by clinical experiments during the past year and a half, and that as a practical adaptation to a purpose, it will save time for the patient and lighten the toil of the dentist.—*Dental Cosmos*, *January*, *1897*.

* * *

SOME OBSERVATIONS ON SUPPURATION IN THE ANTRUM OF HIGHMORE AND ITS VICINITY. By J. Jackson Clarke, M.B. Lond., F.R.C.S. Before considering the morbid conditions of the antrum which more frequently present themselves to the dental surgeon, it may not be out of place to give a brief *resume* of the anatomy of the part. Although the formation of the sinus begins about the fourth month of fœtal life, the space is still very small at birth, and it is not until the second dentition is completed that it reaches its full development. Sections of the upper maxillæ of children ranging from six to nine years show that the anterior or facial wall of the space is thick and contains much cancellous bone. As the eruption of the permanent teeth is completed

the walls of the sinus become thinner from the absorption of the inner layers of bone and consequent increase of size in the antrum. When the adult condition is attained there is a wide range of form and dimensions observable in comparing the antra of different, and even of the same, individual. The generally recognized type-form is the pyramid with the nasal surface as base, and facial, orbital and zygomatic surfaces to complete the tetrahedron. This pyramidal conformation is departed from most frequently by bulgings into the alveolar process of the upper maxilla. In what may be termed the normal condition, it is hardly necessary to say that the antrum comes into close relationship with the outer alveoli of the molar teeth. According to Zuckerkandl the most frequent departure from the average extent of the antrum is an extension from the lower and anterior limit of the space forward over the bicuspid teeth, the alveoli of which then project into the floor of the antrum. When the alveolar extension of the antrum is well marked, the cavity may easily be opened in the extraction of a tooth. A further extension of the cavity is now and then observed; the cavity then extends into the palate, reaching in some instances, according to Zuckerkandl, to within a millimeter or two of the middle line.

Pathological Conditions.—The most important of these in relation to dental surgery is empyema of the antrum, secondary to suppuration about the root of a tooth. When the case is rapid there is no difficulty in following the clinical course of events. As an instance of this class of cases the following case may be mentioned: A man, aged 71, who had been attending my out-patient department at the Northwest London Hospital for a Dupuytren's contraction of the fingers, associated with gout, returned, complaining of pain caused by inflammation about the carious stumps of the cuspid and bicuspid teeth of the right upper maxilla. I referred the patient to my colleague, Mr. C. F. Rilot, who extracted the stumps. The patient came back to me three days later and said that the pain had, if anything, increased. It was now of a neuralgic character, and was referred chiefly to the distribution of the infra-orbital nerve. There was at this time no swelling in the outer wall of the nasal fossa nor any other definite symptoms of antral abscess, but suspecting the presence of pus in the antrum I advised the patient to come into the hospital, but this he declined to do. This delay probably cost the patient his life. A week later he reappeared. The pain had still

further increased, and now there was some redness of the cheek and a distinct swelling in the middle meatus of the right nasal fossa, where the mucous membrane was bulged inwards and presented some flakes of pus. The patient now consented to come into the hospital, and, matters being urgent, I had him prepared at once for operation. Under ether I perforated the antrum through the canine fossa and evacuated over an ounce of thick pus. The antrum was then gently irrigated and the patient was put to bed. The immediate result was a considerable relief to the pain, but the patient complained of headache, referred to the back of the right eye. This headache became somewhat suddenly worse on the fourth day after admission, the temperature went up to 103 degrees, and slight proptosis of the right eye set in. The question of opening the right frontal sinus was now considered, but the deep-seated pain and the character of the proptosis—which was directed forward without any downward deviation—pointed rather to infection of the ethmoidal cells.

While the grave operation of opening these cells through the frontal sinus was under consideration, the patient became unconscious and died with all the symptoms of meningitis. On making a post-mortem examination it was found that the antrum was completely drained. The mucous membrane was detached from the bones forming the upper meatus and roof of the right nasal fossa. The right half of the cribiform plate was necrosed, and the dura-mater covering it was sloughing. The ethmoidal cells were full of pus, and the anterior half of the right cerebral hemisphere was covered with pus. The case was clearly one of antral suppuration, secondary to caries of the teeth, and served to show what grave responsibilities may attach to such cases. Of course, primary antral empyema may be complicated by toothache so that it is difficult to tell which was the first event. In the case just related the mucous membrane of the antrum was thin and not, as it is in cases of primary empyema, thickened, polypous and studded with cystic dilatations of the glands. In diagnosis electric illumination from the mouth is often of great utility,

There is one condition which may lead to or be mistaken for empyema of the antrum. This is a large cyst around the root of a tooth. Such cysts are commonly due to chronic alveolar abscess, and are covered by a thin layer of bone formed from the periosteum which is raised up over the collection of pus. When the tooth is

removed pus escapes, often in surprising quantity, and it may be found that the abscess has extended into the antrum by thinning and perforation of the upper and posterior wall of the cyst.—*Dental Record, January, 1897.*

* * *

A DEFECT IN PLATINUM PINS. By W. Booth Pearsall, F.R.C.S. I. Read at annual meeting of the Irish Branch, at Dublin, December 4, 1896. Twelve years ago I made an upper gold denture for an old lady who had been a patient of mine for some years. She had always treated me with the greatest confidence and good will, and I looked upon her as one of my best friends, so far as my professional skill was appreciated and used by her. The denture was designed to carry plate or flat-backed incisor and cuspid teeth, together with some tube teeth, bicuspids and molars, to fill the places of those she had lost from time to time from gouty inflammation of the socket. The plate teeth were backed with gold, ground and fitted, I hope accurately and well. They were positioned in the mouth and on removal invested in plaster and powdered pumice, the wax attachment removed, the solder duly placed in position, the case heated to redness and carefully soldered. The case was fitted in the mouth and there was nothing remarkable about the appearance of the teeth.

All went well for about two weeks, when a central incisor "dropped off." The teeth were somewhat dark in color and not easy to get, about No. 17 of S. S. White's shades. I was so fortunate as to have some extra sets that exactly matched, and a new central incisor was replaced in lieu of the one that dropped off. Two days later my kind old friend returned with the central incisor I had replaced, together with the left lateral. They were replaced with new teeth from the duplicate sets, and the other teeth were apparently intact and above any suspicion of unsoundness. In three days the patient returned with three teeth off, including the central and lateral which had been replaced. To make a long story short, I backed, fitted and replaced three sets of teeth before the "dropping off" ceased to trouble my patient and myself.

To anyone who takes pains with such work and who has acquired practical skill and experience, such a series of mishaps must be very mortifying; skill and time are spent without a satisfactory result to the dentist, and with a rapid deterioration of the stock of confidence the patient has slowly acquired during visits to the

practitioner spread over many years. I think I can claim a tolerably good knowledge of the practical details of most mechanical work as practiced in dentures, but I confess I was completely at a loss to account for this series of mishaps. Close examination of the backs of the teeth showed a strange crystalline fracture of the platinum pins, quite unlike the fibrous break we are accustomed to notice in soft platinum which has been deliberately broken across. I had obtained the teeth from a house I had been dealing with for years, and they were made by a manufacturer of world-wide reputation. Some inquiry elicited the fact that the amount of platinum in the market is limited in quantity, and it falls under the few products of nature that can be successfully "cornered" by rich and unscrupulous men. There has been a greater increase in the demand for platinum on the part of electricians, and some dishonest person succeeded in placing in the market a stock of platinum wire alloyed with zinc, which was not discovered till great practical inconvenience had been inflicted upon numbers of honest people.

I do not for one moment imagine that any tooth manufacturer would deliberately use unreliable platinum in his goods. But it does happen that this brittle wire gets into our hands in the mineral teeth placed at our disposal for professional use. Although this defect has been indelibly impressed on my mind, I have not, strange to say, come in contact with anyone who has had a similar experience.

A few weeks ago Mr. George M. P. Murray sent me the teeth I show you and asked my opinion as to the cause of the disaster. Close examination showed the same crystalline fracture as in the teeth that had vexed me so much, which I also show you; and I find on chatting over the matter, that Mr. Murray's experience is the same as mine, the teeth "dropped off" as spontaneously and fortuitously as if Sir Isaac Newton himself were waiting for a further example of the law of gravitation. Since Mr. Murray's communication this most annoying kind of accident and its cause have occupied my thoughts a good deal, and I have made a small collection of teeth in which similar "droppings off" have occurred. One specimen supplied by Mr. Murray is a vulcanite molar of English manufacture, and has not been "fired," or soldered, or subjected to any severe tensile strain. Another is a continuous gum molar, belonging to my own stock, the pin of which broke when I was in summer

weather firmly pushing it into the wax-card to which it belonged. The crystalline fracture is well marked, and the tooth is of American manufacture. This annoying defect caused me inconvenience and annoyance in four cases. One was that of the patient I mentioned at the beginning of this little paper, and whose good will and confidence I feel proud to think I still retain after an experience warranted to break a less highly tempered bond of union. The other was that of a patient with an upper denture for an edentulous jaw, the plate teeth of which "dropped off" without the least provocation. The teeth were duly replaced, but that patient considered I had been careless of her interests, and carried her good will and her fees to another practitioner. We had some correspondence on the matter, but her conviction remained unshaken that I had been dishonest in that I used teeth of unreliable and inferior manufacture for her case. I suppose now that I have drawn attention to this matter, other practitioners will place their experiences on record; but except from my friend, Mr. Murray, I have never heard how very mortifying such a technical defect can be to the practitioner. I am afraid I cannot offer you any remedy, except that we should demand from the manufacturers of such unreliable goods a new tooth for a defective one, and without any payment. Were I a manufacturer I would rigorously test all the wire used for pins, and if a sample of this adulterated platinum should come under notice promptly return it on the dealer's hands. The accident to the pin of the continuous-gum tooth, and to the vulcanite molar, clearly shows that it is not caused by *soldering*. I have been watching the soldering of plate teeth for years. I have soldered hundreds of them myself, but I never met with such a defect before. Perhaps our members to-night will tell us how they have fared.—*Journal of British Dental Association, January, 1897.*

* * *

BRIDGE SO CONSTRUCTED THAT THE PORCELAIN CAN BE REPLACED. By Dr. A. L. De Vilbiss, Decatur, Ind. Back the tooth with 28-gauge gold, pure gold is preferable, and allow the gold to extend from one to three lines above the pins, as the case may require; bring down to the cutting edge of the tooth, first grinding the tooth to the desired shape. I always use the teeth with the pins crosswise, not bending the pins. The tooth is put in place with base-plate wax. If you wish to use a bicuspid or

molar you will back in the same way; then swage cusps to fit backing, allowing the cusps to extend a little over the porcelain. After the teeth are in place and properly articulated, you will remove the porcelain with a thin pointed instrument. In the holes you will place lead points, the same as used in pencils (nineteen wire gauge), letting them extend out a little. Cover the backing with stove polish with a hair brush. You are now ready to invest in the usual way, bringing it well up over the cusps, if you have them in the bridge. Wash out the wax, work a little borax down between the backing and the cusps by dropping the powder in and tapping the case with a little instrument, then blow the surplus out. Solder in the usual way. The solder will flow around the carbon pins, and as soon as cold you can dress and remove the carbon pins with a small drill. Put your teeth in place and after they are all carefully adjusted remove again, counter-sink the holes in back of bridge. Cement all of the teeth in place with good cement. You can pinch the ends of the pins together. Then place the bridge in plaster, leaving the pins exposed; after the plaster hardens, rivet. Remove from plaster and finish.—*Ohio Dental Journal, January, 1897.*

* * *

TWO CASES OF DISEASED MAXILLARY SINUS. By W. H. Todd, D.D.S., Columbus, O. Among a number of cases sent to me by one of our leading surgeons are two of which I wish to speak. The first one, a gentleman, was directed to come to Columbus to be treated for what he supposed might be a cancerous tumor. The surgeon sent him to me to make an examination of his mouth. I found a number of ordinary cavities to be filled, the right superior first molar gone which, he said, had been extracted in February, about the time he began to suffer, and it was in July when I saw him. From the socket, which had not healed up, as usual, there was an ugly-looking spongy tumor or fungus growth which had grown down so that it hid from view the second molar and protruded into the mouth. In probing I found that with very little difficulty I could go into the maxillary sinus, causing a discharge of pus. I began by dissecting this tumor and syringing with warm water containing a few drops of carbolic acid until I had gotten rid of the growth, when I found the opening in the antrum as large around as a lead pencil; the cause of all the trouble was then apparent. In extracting the tooth one root had been broken off and

and wishing to get free access to the seat of the disease, I extracted it and was thus enabled to force my washes through this channel to almost all parts of the diseased territory. For cleansing and correcting the offensive odor I thoroughly washed the diseased part with lukewarm water and peroxid of hydrogen, following this with permanganate solution of about 4 or 5 grains to ½ oz. of water. As a stimulant and agent to assist in throwing off the sequestrum I used the following wash: Aromatic sulfuric acid, 2 drams; tr. capsicum, 10 grains; aqua, 2 drams. This treatment was kept up until pus almost ceased to flow, and the jagged points of bone could be perceptibly felt through the gums, when an incision was made and the sequestrum removed, after which antiseptic washes were employed until the wound had quite healed and all signs of inflammation had disappeared.—*Ohio Dent. Jour., January, 1897.*

* * *

SMOOTH-POINTED PLUGGERS. By C. G. Myers, D.D.S., Cleveland. Read at Ohio State Dental Society, December, 1896. About five years ago I discarded serrated pluggers and began using those with smooth points. The idea was original with me, as I had never heard of them being used. Being a constant reader of most of the leading dental journals, I was surprised to find nothing in them on this subject. I have also quite a large acquaintance among dentists in almost all parts of this country and with all my questioning I have yet to find the first who is using smooth-pointed pluggers. It is only within the past month that I have heard that a number of years ago they were used and that articles concerning them appeared in the dental journals. My first object in presenting this paper was that it was something new, but now it is presented with the idea of finding out wherein lies the fault in these instruments which I have apparently used with such great success. When I was in college, ten years ago, the pluggers we were taught to use had deep serrations and some of the leading cohesive foil operators advocated them. In late years the tendency seems to be toward shallow serrations. Dr. Ottolengui recommends the point of a broken instrument, where we have only the roughness of the grain of the steel. The advantages I claim for the smooth over the serrated pluggers are these: Closer adaptation to the walls and margins of the cavity; greater density of filling, which is apparent in finishing or polishing, and the greater ease with which we can work the gold

found its way into the antrum, where it remained until it was washed out. In a week the gentleman returned home with the antrum trouble on the road to recovery and the other teeth filled.

The second case, a lady, was advised to consult with me; in this case there was no swelling and the teeth were apparently in good condition. She said she had suffered about four months and had lost from forty to fifty pounds in weight. All this time there was a dropping of pus into the pharynx from the nasal fossæ, which had been syringed and treated, but without success. The last dental work that had been done was the right superior second molar, with a very nice looking amalgam filling, which she said had been put in without pain, a short time before her trouble began. I took the filling out and found the decayed dentin had not been removed, and the pulp, still in the canal, in a decomposed condition. I extracted the tooth and opened up into the antrum and found it full of a dark, nauseating pus. I syringed out and treated, and at the end of ten days the case was dismissed as cured.—*Ohio Dent. Jour., Jan., 1897.*

* * *

NECROSIS FOLLOWING CHRONIC ABSCESS. By W. D. Snyder, D.D.S., Sidney, O. In the latter part of December, 1892, a case of what was supposed to be chronic abscess of the superior incisors was referred to me for examination and treatment. Patient, healthy man of about middle age. Occupation, farmer. Upon inquiry, I was given about the following history of the case: Some six or eight months previous the centrals and laterals had been filled with gold. From some cause the teeth became very sore and ultimately abscessed. The patient returned to his dentist for treatment, when the right central was extracted and others treated, but without success, so far as the getting rid of the abscess or flow of pus from the gums. This condition kept up during the summer and fall of 1892. When the patient presented himself to me, upon examination I found the following conditions: Labial aspect of that portion of gum extending from left central to right bicuspid not swollen but very much thickened, of a deep red, almost purplish color, with pus oozing from two or more fistulous openings.

I at once diagnosed the case as containing dead bone, but supposed the disease had not extended farther than the alveoli, but upon injecting permanganate solution found it passed through the floor and into the nose. Finding the right lateral very much involved,

others do not. He particularly calls attention "to the immediate practical value of the general habit of the profession to regard teeth that are seen to be decaying rapidly as soft teeth, teeth that are poorly calcified and will eventually be lost on account of their poor quality, to be erroneous, it being a demonstrated error that teeth which decay rapidly are as well calcified, strong, and dense as teeth in which no decay appears; it being emphatically not a difference of the percentage of calcium salts in teeth which constitutes the basis of the difference of their susceptibility to caries;" going on to say that teeth which decay rapidly are sufficiently hard for any kind of filling-operations, demanding the highest and best judgment in mechanical treatment instead of substituting something that is easily done.

From clinical observation, Dr. Black is undoubtedly correct in regard to color having no weight in indicating variations in structure; lime-salts, with water and pigment, probably giving an animated expression. The color and shade being a unit in the harmony of temperament, temperament and color, clinically, make no distinction in liability to caries. The simple question involved is, Are young teeth as well served by dense gold fillings as by those of less specific gravity, depending upon adaptation, or, in other words, protection until the hardening process is perfected, which we find to be so potent and manifest from clinical observation, it being the essential means and object sought for in the physiological cure for caries?

Dr. Black, in his recent experiments, finds that man living upon "natural food would be able to close his jaws with a force of 300 pounds, whereas in a civilized state and depending upon artificial preparation of foods, the amount of stress that would be borne by the individual tooth without severe pain or injury is reduced to one hundred pounds or less in a state of apparent health." This condition is undoubtedly in harmony with clinical observation, as noted in bringing into use teeth that have been disarticulated for a time—how little pressure will produce pain in the peridental membrane; and in an inverse way, how the undue pressure upon carrying one end of a bridge will cause absorption of the root.

Dr. Black admits that these investigations do not clear up the mystery which still prevents an explanation of the reason "why some people are very susceptible to caries, others less so, and still

in narrow or contracted spaces. For the benefit of those who have not used the smooth points, I would say I use those having a broad point and a contracted shank, or those of the club-foot variety. The points are bright and tempered very hard, and are kept bright by rubbing from time to time on a piece of sole leather. They cannot be used with hand-pressure. The question is often asked me if these pluggers are applicable to contour as well as flush fillings. They certainly are; in fact I know of no limit to the contour I would attempt with them. Cohesive gold has the property of being welded one piece with another, and it makes no difference whether we use deep or shallow serrations, or whether we use clean burnished points. In fact I claim that the serrations are a disadvantage rather than an advantage.—*Ohio Dental Journal, January, 1897.*

* * *

PHYSIOLOGICAL CURE OF DENTAL CARIES FROM CLINICAL OBSERVATION. By Dr. H. C. Register, Philadelphia. Read before Pennsylvania State Dental Society, 1896. Dr. Black, in his recent investigations as to density, percentage of lime-salts, strength, etc., occurring in the human teeth, has caused the displacement of the rudder in the dental ship while under full sail, and many of us are flopping in the wind and may drift upon the rocks of professional disaster if we let go the sheet altogether and base our practice upon the theory that a formed tooth, as first erupted, will accept a gold filling of the higher specific gravity as readily as it will in later life. And yet his experiments are conclusive so far as they go and must stand as demonstrated facts.

Dr. Truman says of Dr. Black's great work: "Any attempt to express for or against the work of anyone, when this has been based on actual investigation, would not only be valueless but the height of folly;" and, continuing, "Viewed in any light, the labor of this very able worker in untrodden fields must be held to be most painstaking and thorough;" observing, however, "The controversy between 'soft teeth' and 'dense teeth' has not been settled by these investigations."

The color of the teeth, heretofore serving as a guide in determining their structural density and liability to carious attack, is set aside as fallacious, as shown by Dr. Black's tables, as he found in the percentage of lime-salts in all teeth so slight a variation that it ceases to be the conditional cause why some teeth decay rapidly and

containing a large proportion of organic matter rarely or never decay, which indicates that the presence or non-presence of organic matter is not an important factor in the phenomena of dental caries."

The investigations of Drs. Miller and Black on the subject must be ranked as the most important ever made. Dr. Williams, however, accepts the liability of the human teeth to caries as absolutely due to environing conditions and not to inherent structure, saying "that no tooth will decay if its environment be healthy, and no tooth can resist decay if its environment be 'unhealthy,'—unhealthy meaning such particular external conditions as are inimical to the preservation of the tooth." This does not hold good absolutely, clinically, and he falls back upon the assertion that it would be going too far to claim that tooth-structure had no relation to caries; "but even such a statement would be nearer the truth than the position occupied to-day by a large majority of the dental profession."

Are we not applying in methods of practice much that is drawn from clinical deductions that cannot be reasoned out, and yet appears to be correct? Just as Robertson inferred from observation, half a century before the science of "bacteriology" existed, that the active cause of caries was an acid; as scientifically shown by Miller in his great work that microorganisms are the active agents in forming an acid. Acid alone does not produce caries, though it may enter largely into erosions and gouty conditions; which, however, have no place in this paper.

No less surprising are Dr. Black's experiments with gold, showing the teeth are always harder than gold can be made; and while he lays much stress upon the physical or cohesive properties in making fillings dense and hard, adaptation takes precedence of all else, for he says, "no matter what the density or strength, in performing the operation this must be the first count," which is borne out by clinical observation.

Dr. Custer has found cohesion to be developed at a much lower degree of heat than is generally supposed, saying it may be so low that gold may be subjected to it for days without injury and still be highly cohesive.

From clinical observation teeth are saved or lost under gold manipulation in degree as the physical property of gold is appreciated. In an indiscriminate selection of fillings by myself and taken from records, carefully kept since 1883, I find the following results:

others immune;" but they do clear up a grave misconception as to the influence of differences in the per cent of basic matter as a factor in caries; for heretofore it has been thought, in the dental profession, that the relative susceptibility of tooth-structure to caries was attributable to these differences in the percentages of lime-salts they contain. Now we know this to be fallacious.

These surprises to the profession are continued in connection with Dr. Williams' recent investigations on the formation of enamel, in which he treats that part of the tooth as a petrified dermal appendage, absolutely lifeless and unchangeable, in contradistinction to the theory of its being a connective-tissue product, related in some way with continued life-stimulus. He says, "Enamel is a solid mineral substance, and the finest lenses reveal not the slightest difference between the enamel ground moist from a living tooth and that which has laid in the earth a hundred centuries." If this be absolutely true, accepting that the filtration of water from the dentin has no influence upon enamel in holding nutrient matter, it must influence us in our work. This, with Miller's great work in showing the active cause of caries to be local, does not wholly explain the predisposition to points of attack where no local factor resides, also the coincidence of teeth decaying on opposite sides of the mouth in the same positions; both ripe questions which cannot be ignored.

These conditions and the deductions drawn from clinical observations point to some constitutional influence, as Dr. Gerhart so suggestively pointed out in his strong paper read last year, that "The etiology of caries has its conception in the negative fact which obtains as a consequence of diminished touch, resulting from changed environment brought about by a change in the physical characteristics of food, this condition exercising an influence by diminishing the activity of the physiological process which gave the previous deterrent power to the dental tissues."

Local conditions do not explain the facts. Temperamental conditions show no variation in the susceptibility to attacks, predisposition, or the susceptibility of tissues obviously being underlaid by some constitutional dyscrasia that leads to a local lesion by permitting microorganisms to find a proper habitat and bring about tooth-destruction.

Dr. Williams says, "The teeth which contain little or no organic matter often decay rapidly. The teeth of many animals and fishes

The Dental Digest.

PUBLISHED THE

TWENTY-EIGHTH DAY OF EVERY MONTH.

Editorial.

RECENT IMPROVEMENTS IN FILLING TEETH.

On page 63 we publish in full the paper of Dr. G. V. Black read at the anniversary meeting of the Chicago Dental Society, February 1 and 2.

The subject of the paper, as announced on the program, "Recent Improvements in Filling Teeth," but faintly indicates its nature. The question of the anatomical relations of the teeth to each other and to surrounding parts, the physical characteristics of the teeth and their ability to withstand stress, the cause and nature of dental caries, the plan of manipulation and the material to be used in filling teeth—all of these are therein discussed. Furthermore, a cause is given for the loss of teeth from destruction of the sockets (pyorrhea).

Although the essayist raises four or five of the most important questions connected with dentistry for discussion, the chief point of his paper relates to the treatment of the proximal surfaces. He advocates contouring the interproximal space when there is a disposition of the proximal surfaces of the teeth to caries. That is, he advises cutting away the entire proximal surface of tooth substance clear to the free margin of the gum; the buccal and lingual surfaces also are to be cut away sufficiently to place the line of margin so it will be constantly cleansed by the food in process of mastication, and the parts thus removed are to be restored with cohesive gold, contouring sufficiently to protect the interproximal space, and so shaping that the excursions of food will keep the surface clean. This method, when properly carried out, will prevent recurrence of decay of the proximal surfaces more surely than any other, but think what it means in the majority of cases to adopt such extreme measures, both from the standpoint of patient and operator. The preparation of cavities, filling and finishing of filling, when conscientiously performed, must consume from four to six hours of time, independent of that taken in securing the necessary space, besides requiring

		Average.	Longest Service.	Doing Service.
Gold	335 fillings	7.73 yrs.	12 yrs. 10 mo.	178
Globe alloy	176 "	5.18 "	12 " 7 "	10
Rogers' alloy	126 "	4.9 "	10 " 5 "	2
Welsh alloy	151 "	4.5 "	11 " 9 "	18
Gutta-percha	173 "	3.07 "	10 " 3 "	46
Phosphate zinc	182 "	2.8 "	12 " 3 "	50

This collection of figures representing the life of these fillings, if added to those doing service, would probably make the gold fillings average nine years, alloy eight years, and gutta-percha and phosphate of zinc three years. It is presented to show the transient influence of fillings generally. While gold stands at the head of the list, and though considering it the best material for filling teeth where indicated, there are so many different methods in its use that it really remains an open question.

It had been my intention, in preparing this paper, to show by tabulated records how the several materials generally used for filling teeth differed in causing secondary dentin to form under a filling through influence of manipulating the material; but the investigation of the charted record was taken up too late, it proving to be a much larger work than was at first supposed. This short table is not intended to show that any one material is better than another; but it had been my intention to see what difference, if any, existed between these, which are the results of methods usually pursued, and those I have made general in my practice during the last half-decade.—*Dental Cosmos, January, 1897.*

AMOUNT OF GOLD USED.—In answer to a query I received the statement from Morgan, Hastings & Co. that annually there are used in the United States 30,000 ounces of gold for filling teeth, which is a very conservative estimate.—*F. J. Fesler.*

ANESTHESIA DURING SLEEP.—It does seem to me that chloroform may be administered during normal sleep, to the degree of perfect anesthesia, without arousing the sleeper, more frequently than we believe.—*Israel Cleaver.*

I operated upon a little girl who had been run over by a trolley car. We went to the house at 10 p. m. and found the child asleep. We gave chloroform and amputated two toes. The child awoke later and knew nothing about the operation.—*Longaker.*

One element of danger is that in many persons during sleep the vitality is at much lower ebb than during waking hours, and a fatal termination might result.—*Burr. In Med. Record.*

an amount of skill and good judgment not possessed by the majority of operators. We should say that, except in extreme cases, it would be more rational, after removing the decayed portions, to cut away only so much of the tooth substance as would allow us to anchor the filling properly. There are several reasons for this, the first being that but a small number of those requiring the services of a dentist could afford to pay for such operations as advocated by the essayist.

Furthermore, if the perfect contour is restored we get all the advantages, both as to comfort of chewing and cleansing of the surfaces by excursions of food, without making the entire proximal surface of gold. Then, in accordance with the theory of self-cleansing, by restoring perfectly the part destroyed the most dangerous portion is protected by the filling. We quite agree with the essayist that the more of the tooth surface you cover with gold, the less chance there is for new cavities to form, but we should adopt the course he advocates—removing unaffected tooth substance and always obtaining perfect contour—only in the most extreme cases.

In making this proposition we have in mind the fact that decay will recur when the teeth are not well taken care of, if the influences which cause caries to progress are still present, and decay is more likely to recur on the proximal surfaces than on any other portion of the tooth. But if the patient has been well trained by the dentist in caring for the teeth, decay is not likely to recur, and the conditions inducing decay often disappear in part or altogether. If, on the other hand, this tendency to decay is very great it will attack other portions of the tooth which are not covered with gold, besides the proximal surfaces. And this suggests the question why teeth decay so much more in some mouths than in others, or in the same mouth at different periods? And why the enamel of teeth disappear when there is no "agglutinating substance," in the condition we call erosion.

The work of Dr. J. L. Williams, referred to at length by Dr. Black, will be appreciated by microscopists, but it did not impress us as being so new or extraordinary, for we had supposed the beginning of decay on the proximal surfaces of the teeth was much the same as its beginning elsewhere, and that it was generally believed to be produced by microorganisms of the mouth. And from careful observation at the chair for a period of twenty odd years we have many times been surprised at places where there was apparently but

a slight change in the color of the enamel of the tooth, which revealed, after careful examination, a destruction of the tooth substance amounting to a deep cavity. Our way of accounting for this is that the force and friction usually exerted on other affected surfaces is not nearly so great on the proximal surfaces, hence the partially disintegrated tooth substance is not broken down so quickly at these points of attack. But we will have more to say on this subject in a series of articles we purpose furnishing our readers, under the title of "Diagnosis and Treatment."

The discussion of Dr. Black's paper did not take the wide range that it merited, the different speakers, as is often the case, drifting into details of manipulation, and there were so many strangers present whom all desired to hear that we gave way and did not discuss the paper at the meeting. For this reason we have dwelt at some length on these very important questions, feeling that there are no more important ones in the whole range of dentistry. We have seldom heard a paper which suggested so many lines of thought, and the proper care of the proximal surfaces of the teeth being the most important and difficult problem in the practice of dentistry, this paper must result in great good. We commend the study of it to our readers and solicit opinions and criticism for our columns.

News Summary.

FENNEL OIL in dose of five to ten drops, twice daily, is reported to be efficacious in whooping-cough.—*Medical Record.*

TO RENT—To a dentist—Elegant rooms in suite 1002 Champlain building, in company with a physician; rent $32.50 per month.

THE STOMATOLOGIST.—We are glad to welcome to our ranks *The Stomatologist*, a new and bright monthly journal published by the Alumni Association of the Philadelphia Dental College.

VULCANIZER EXPLODED.—The Sibley, Iowa, paper of December 12 reports that the explosion of a vulcanizer in the dental rooms of William Schlawig fatally injured the dentist's wife. The head of the vulcanizer struck her in the forehead, fracturing her skull.

TO KEEP SPITTOON CLEAN.—Mr. A. W. Wright, Jr., of London, finds that a little sulphate of copper sprinkled inside the spittoon (metal or earthenware) before the day's operations commence, prevents any unpleasant odor, does not allow the interior of the spittoon to become furred, and renders it much easier to cleanse than usual.—*Ash's Circular.*

IVY POISONING.—A case of complete and immediate relief from the effects of ivy poisoning is reported in the *Medical World* by Dr. W. L. Shanks. His patient was swollen from head to foot, and in an hour after bathing in a solution of sodium hyposulfid was attending to business as if nothing had happened.

LOCKJAW CAUSED BY A TOOTH.—Dr. Sache (*Centralbl f. Chir.*, 1896, No. 40) reports a case of lockjaw which for four years baffled the skill of several physicians. Dr. Sache found the right superior third molar projected externally in a horizontal direction pressing against the internal pterygoid muscle so that the patient was unable to open his mouth. Eight weeks after extraction of tooth patient could open jaws normally.

DEFECTIVE TEETH AND CATARACT—Several cases reported with double zonular cataracts and teeth presenting marks due to arrest of development. Attention may be drawn to the close analogy between the development of the crystalline lens and that of a tooth. Any cause interfering with the growth of the lens, or of a tooth, might produce the peculiar zonular cataract in the one, and the defects in the enamel of the other, which had been variously assigned to the action of convulsions, rickets, or mercury.—*Dental Record.*

DEATH FROM DENTITION.—The *Cambridge Chronicle* for December 24 contains a notice of an inquest held respecting the death of a child, aged 15 months, due, according to the evidence of the medical man, to dentition. The facts of the case are briefly as follows: The mother noticed that the child became ill on the previous Saturday, and as the symptoms continued to become worse she went for the doctor on Tuesday, but the child died before she returned. The medical man in his evidence stated the post-mortem examination showed that the child had been well nourished and that all the organs were particularly healthy. Teething had set up irritation of the gums and caused convulsions, from which the child died. He stated that medical assistance should have been called in earlier, for if the gums had been lanced in the afternoon the child's life might probably have been saved. —*Jour. Brit. Dent. Assn.*

CONGENITAL TEETH.—By J. Q. Allen, M.D., Montrose, Colo.—From the time of the deformed Richard to the present this condition has been looked upon as an ill omen, and the midwives inform us that a child so born is sure to die within a few months. I hope to be able to prove the contrary. On January 12 last my wife gave birth to a nine-pound girl baby—our first. The child was well developed and normal in every way with the exception of having two lower incisors. Within two months these teeth turned black and seemed about to decay but never became loose. After a time they cleared up and now look like ordinary teeth. She began to walk at ten months and is now, at a little more than eleven months, well nourished, weighing twenty-two pounds, and runs all about the house. She has recently cut one upper incisor. These cases are interesting, and I would like to know if there are ever more than the two usual sets of teeth, or will these congenital teeth be the ordinary temporary set.—*Medical Record.*

AN UNHEARD-OF THING.—Doctor (to messenger boy)—So yo' mummer say ez what the yarbs ain' done her no good? Wait er minnit (consults book). "Yi! I thought so! Ask yo' mummer how she spec de yarb do good when de bill ain' paid?—*Harper's Bazar.*

NEWLY DISCOVERED CONSTITUENT OF THE BLOOD.—Dr. Muller, of Vienna, has described certain particles found in the blood under the name of hæmokocia (blood dust). They resemble fat globules and the largest are 1-25000 of an inch in diameter. They are motile and are unaffected by osmic acid.—*Am. Micro. Journal.*

HALLUCINATION AND ANESTHETICS.—In the case of State vs. Perry, the Supreme Court of Appeals of West Virginia held that expert medical testimony should determine whether or not hallucination, while under the influence of an anesthetic, was responsible for criminal charges preferred against a physician by a female patient. If a probability of such hallucination is established, and the charges rest entirely on uncorroborated testimony of the patient, the jury, it held, should acquit the accused.

Notices.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

The Illinois State Board of Dental Examiners will meet Monday, March 29, 1897, at Chicago, for the purpose of examining candidates and transacting other business. All persons intending to appear before the board at that time should notify the secretary not later than March 15.

L. L. DAVIS, Secretary.
1303 Columbus Memorial Building.

EASTERN ILLINOIS DENTAL SOCIETY.

The eleventh annual meeting of this society will be held at Mattoon, Ill., on Tuesday and Wednesday, March 16 and 17, 1897. A cordial invitation is extended to the profession to attend. The officers are: President, Dr. I. A. Lumpkin, Mattoon; Vice-President, Dr. E. E. Kimel, Bement; Treasurer, Dr. S. A. Cambell, Mattoon; Secretary, Dr. F. M. Conkey, Homer; Librarian, Dr. O. T. Eddy, Decatur; Supervisor of Clinics, Dr. W. A. Hoven, Gibson; Executive Committee, Drs. Cambell, Dameron and Conrad.

CENTRAL ASSOCIATION OF NORTHERN NEW JERSEY.

At the annual meeting of the Central Dental Association of Northern New Jersey, held February 15, 1897, the following officers were elected for 1897-98: President, Dr. William L. Fish, Newark; Vice-President, Dr. F. Edsall Riley, Newark; Treasurer, Dr. Charles A. Meeker, Newark; Secretary, Dr. Herbert S. Sutphen, Newark. Executive Committee, Dr. George E. Adams, South Orange; Dr. W. E. Truex, Freehold; Dr. C. S. Hardy, Summit; Dr. F. S. Gregory, Newark; Dr. Fred C. Barlow, Chairman, Jersey City.

H. S. SUTPHEN, Secretary.

STREATOR PROFESSIONAL FELLOWSHIP CLUB.

There is no reason why the dentists living in small towns should not be on the most friendly terms. At Streator, Ill., the dentists have just organized the following society.

Basis of membership in the Streator Professional Fellowship Club: With the desire for mutual benefit and professional fellowship, and to help each other in all worthy ways—in intellectual, ethical and professional culture—the undersigned have associated themselves in a professional fellowship club. The officers shall be a president, vice-president, secretary and treasurer, whose duties shall be the same as those usually borne by such officers. Meetings shall be held from time to time as the members desire. The officers and members are: Dr. J. A. Curry, President; Dr. T. F. Henry, Vice-President; Dr. D. Davison, Secretary and Treasurer; Dr. F. O. Finley and Dr. C. R. Taylor.

The first meeting of the club will be held Thursday evening, March 4, 1897, and the president will read a paper on some practical subject for discussion. This club hopes to reach the dentists in the neighboring towns, where there are only one or two, and thus cultivate good fellowship and professional rectitude. This effort should meet with the hearty approval of the profession.

LIST OF LATEST DENTAL PATENTS.

575,684. James Baxter, Fort Wayne, Ind. Dental Chair.
575,894. James E. Keefe, Chicago, Ill. Dental Clamp.
575,750. George H. Winkler, New York City. Dental Tool.
576,089. Amenzo H. Butterfield, Stamford, N.Y. Dental Engine.
576,518. Elisha D. Hinkley, Denver, Colo. Dental Rubber-Dam Holder.
576,142. Daniel Murlless, Holyoke, Mass. Rubber-Dam Clamp.
576,471. Frank Ritter, Rochester, N. Y. Dental Chair.
576,722. William Caille, Jr., New York City. Tool-Moistening Device for Dental Handpieces.
576,593. Howard S. Lowry, Kansas City, Mo. Dental Appliance.
577,254. Harry E. Hawksworth, Philadelphia, Pa. Means for Raising or Lowering Dental Chairs.
577,063. Johannes T. Pedersen, Woodside, N. Y. Dental Handpiece.
577,064. Johannes T. Pedersen, Woodside, N. Y. Slip-joint for Dental Handpieces.

Obituary.

DR. E. L. CHILDS.

Dr. E. L. Childs died at Conway, Mass., May 27, 1896, of cancer of the mesentery. He was a native of Massachusetts and studied dentistry with Dr. E. Lincoln Clark, now of Dubuque, Iowa. He commenced practice in Pittsfield, Mass., and subsequently removed to Brooklyn, N. Y., and again to Nebraska, when failing health compelled a return to his former home in New England among the mountains of Conway, Mass.

Dr. Childs was well known to many in the profession, particularly in Brooklyn, where he practiced many years. He was one of the original members of the Brooklyn Dental Society and was unusually active in all that

could increase its usefulness. He, with others, enjoyed the satisfaction of knowing that it ranked at least equal to any local society at that period.

Dr. Childs adds to the large number of those who will no longer greet us at our society gatherings. Thirty-six years have passed since we first met him, and we vividly recall his willingness to aid every movement for the development of society interest in Brooklyn. That city owes much of its advancement in professional affairs to the influence of this society, and we wish to accord to the memory of Dr. Childs the share he had in it with ourselves.

G. ALDEN MILLS.

DR. GEORGE C. BROWN.

The following resolutions were passed at a special meeting of the New Jersey State Dental Society, Friday evening, February 5, 1897, at Newark:

Whereas, It has pleased Almighty God to remove suddenly from the midst of his active labors our fellow-member and treasurer, Dr. George C. Brown;

Resolved, That the members of this society hereby desire to place upon record their high appreciation of his manly Christian character, and of his high professional standing, as well as his genial and pleasant presence;

Resolved, That we mourn his death as a personal as well as professional loss, and hereby desire to testify to our high appreciation of the efforts he always and at all times gave to the profession of his adoption, and his devoted activity to the advancement of its welfare;

Resolved, That we mourn with his afflicted family and extend to them in this hour of trial our sympathies; and

Resolved. That a copy of these resolutions be sent to his family, and be placed upon the minutes of our society, and be published in the journals devoted to dentistry.

Committee { C. S. STOCKTON, F. C. BARLOW, J. ALLEN OSMUN, Chairman.

DR. FRANCIS PEABODY.

Dr. Francis Peabody died at 3 a. m., January 30, 1897, at Fort Myers, Fla., where he had gone to try and regain his health, which had been failing for some time. The remains were taken to Cincinnati for cremation. Dr. Peabody was born in Boston, January 22, 1833. He came to Louisville while yet a young man and began the study of dentistry with his uncle, Dr. W. H. Goddard, who was one of Louisville's distinguished dentists in the early days. After studying with his uncle for some time he went to Cincinnati and graduated in his profession from the Ohio Dental College.

He married before the war and went to Tennessee with his wife and two children. During the war he lived near Nashville, and while he took no part on either side, he sympathized with the lost cause. When the Union troops invested the town in which he lived he was suspected of being a Confederate spy and thrown into military prison. The authorities were quick to learn his innocence and he was released with all due amends. His wife and little boy

died shortly afterwards, so Dr. Peabody returned to Boston with his little girl, whom he gave into the care of his sister. She is still living there.

Then Dr. Peabody returned to Louisville and again began the practice of his profession with his uncle. He remained there until 1871, when he went to Brazil and practiced his profession in Rio Janiero. He again returned to Louisville and remained there until his death. In 1882 he married Miss Nannie E. Williams, who, with two children, survives him.

Dr. Peabody was perhaps one of the best-known dentists in Kentucky. He was elected to the faculty of the Louisville College of Dentistry in 1888 and had been president of that institution about six years. He had been the president of the Kentucky State Dental Association and chairman of the board of censors, both very distinguished honors. He was a member of the National Association of Dental Faculties, American Dental Association, Southern Dental Association and Mississippi Valley Dental Association. He was one of the first to join the Dental Protective Association and he aided its work whenever possible. He was elected president of the Falls City Dental Club last year. He was an enthusiastic student and able teacher and a practitioner of rare skill and ability.

At the Louisville College of Dentistry and the Hospital College of Medicine a committee was appointed to draft suitable resolutions. Following is the action of the committee:

Professor Peabody was the champion of many advances in the dental education within the period of his professional career. He always insisted upon the intimate relation of dentistry to the profession of medicine, and maintained that the ethics of the medical profession necessarily included the profession of dentistry. He was an enthusiastic student and able teacher and a practitioner of rare skill and ability.

Resolved, That we deeply deplore his death and feel keenly the loss of his wise counsel, and the great loss of his services to this college.

Resolved, That in our judgment the dental profession has suffered the loss of one of its ablest members.

Resolved, That the college buildings be draped in mourning for thirty days, and that the buildings be closed on the day of the funeral.

Resolved, That a committee communicate with the family of the deceased and make suitable preparations for receiving the remains on arrival at the depot and aid in the arrangements for the funeral.

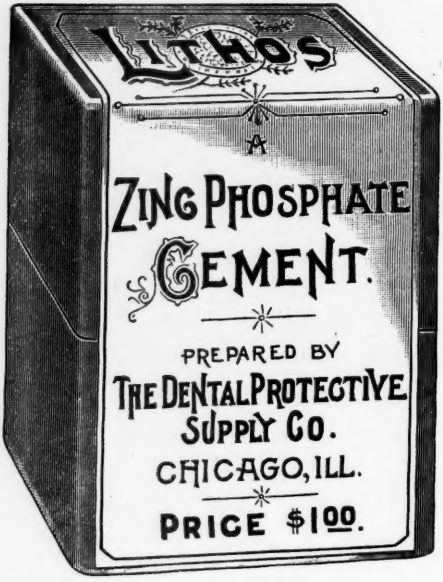
Resolved, That the joint faculties and students attend the funeral in a body.

Resolved, That we tender to the family of the deceased colleague our profound sympathy and condolence.

Resolved, That a copy of this action be furnished the family of the deceased, and that it be made a part of our permanent records.

Resolved, That a copy be furnished the press for publication.

EDWARD M. KETTIG,
JOHN A. LARRABEE,
HENRY B. TILESTON,
THOMAS HUNT STUCKY,
DUDLEY S. REYNOLDS.
} Committee.



COLOR—YELLOW.

Is non-conducting; non-irritating to the pulp; it neither shrinks nor expands; gives no pain whatever to sensitive dentine; is thoroughly compatible with tooth-structure; possesses the desirable quality of easy mixing; retains plasticity sufficiently long for proper manipulation.

For the attachment of crowns, gold caps and inlays, this cement gives excellent results. It has a durability equal to the best cements on the market.

PRICE, $1.00.

Eucain Hydrochlorate

FORMALIN
TRIKRESOL
Crede's Citrate of Silver
Crede's Lactate of Silver

A NEW LOCAL ANESTHETIC, far less toxic than cocain, while fully equal to it in anesthetic effect, and permanent in solution. Eucain Hydrochlorate has been used with excellent results by Geheimer Medicinalrath Prof. Dr. O. Liebreich, Dr. C. L. Schleich, Sanitætsrath Dr. Reichert, Prof Dr. Warnekros and Dentist Kiesel, all of Berlin, Dr. Emile Berger, of Paris, Dr. R. Brudenell Carter, of London, A. Swanton Burke, D.D S., Theod. F. Chupein, D.D S., E. C Baughan, D.D.S., all of Philadelphia, S. C. G. Watkins, D.D.S., Montclair, N. J., A. A. Shaw, D.D.S., Cambridgeport, Mass., and others.

Directions for the Preparation of a Sterile 5 per cent solution of Eucain, as generally employed in dentistry and surgery.

To 1 part of Eucain Hydrochlorate add 20 parts **distilled** water (for example 15 grains of the drug to 5 fluid drams of the menstruum) and heat the mixture in a test tube or other small vessel under constant shaking, until solution is effected. If it is not quite clear, the solution must be filtered. It is then heated to boiling in the test tube, the mouth of which must be plugged with cotton.

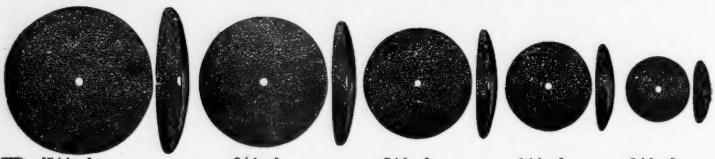
Cooling can be hastened by holding the tube in cold water, and the solution is then ready for use.

As Eucain solutions can be rendered absolutely sterile by boiling immediately before use, no admixture of antiseptics is required. In this respect it differs from cocain, which is decomposed by boiling. **Distilled water** only should be used for the Eucain solutions.

Literature Upon Application.

Schering & Glatz, 55 Maiden Lane,
NEW YORK...Sole Agents for U. S. and Canada

TEAGUE'S DEPRESSED DISKS.



⅞ inch. ¾ inch. ⅝ inch. ½ inch. ⅜ inch.

These Disks are made to fit the convex surface of a tooth and thereby preserve the contour in dressing a filling. Cut from Sand Paper, Emery Paper, Cuttlefish Paper, Emery Cloth and Crocus Cloth. Coarse and fine grits of each, except Crocus Cloth; this is of a very fine grit for a lustrous polish. In addition to the above material, Disks of fine and coarse Garnet Paper are put in the boxes of Assorted Disks. A chart for accuracy in ordering Depressed Disks furnished on application.

Depressed Paper Disks			in boxes of	100, 15 cts.
"	Cloth	"	" "	100, 35 "
"	Assorted	" sizes ⅝ in., ¾ in.	" "	200, 30 "
"	"	" " ½ in., ⅝ in., ¾ in.	" "	400, 60 "
"	"	" " ⅜ in., ½ in., ⅝ in., ¾ in., ⅞ in.	" "	500, 75 "

OTHER SPECIALTIES.

Teague's	Impression Compound	4-lb. can, 50 cts.
"	Sand Paper Strip Chuck	25 "
"	Cavity Cap Disks	per 100, 25 "
"	Capsicum Plasters	" 100, 50 "
"	Arm-rest	$1.00

SOLD BY

Dental Protective Supply Co., 1101-3 Champlain Bldg., Chicago.

Patented Feb. 5,'95

"No. 1" Handpiece

Designed and Manufactured by

The Dental Protective Supply Company.

A glance at the accompanying cut illustrating this Handpiece will demonstrate the simplicity of its mechanism.

We have endeavored to design and place before the profession the most simple and durable Handpiece made.

The special features of the Handpiece are the double end chuck, the improved locking device, and long and efficient bearings.

Ample provision has been made for taking up all wear, and we guarantee that if the bearing surfaces are kept clean and well oiled, this Handpiece will last for years and prove the best that has ever been placed upon the market.

It is adapted to hold different forms of bit shanks (except cone journal) which can be inserted or taken out from the Handpiece while the engine is in motion; it is also designed so that it can be attached to any Dental Engine, and will fit all ordinary right angle attachments.

Owing to the entire absence of screws the Handpiece can be taken apart without the use of wrench or screwdriver, and is so constructed that escape of oil upon the hand of the operator—an objectionable feature in some Handpieces—is entirely avoided.

In ordering our **No. 1 Handpiece** it is essential that you give all necessary particulars as to the style of your engine and attachments.

PRICE $10.00

ORDER DIRECT FROM

The Dental Protective Supply Company,

Chicago, Illinois

During the Last Half Century

says Dr. F. H. Funston in *Popular Science News*, "dentifrices have multiplied by thousands, each presenting its own peculiar claim. Some are really valuable; others are harmless; not a few are dangerous. Tooth powders, too, which sometimes accompany fluid dentifrices, must also be looked upon with suspicion, as they not infrequently contain ingredients that may prove detrimental

"A recent improvement in this line is

EUTHYMOL TOOTH PASTE

manufactured by Parke, Davis & Co., Detroit, Mich., and Walkerville, Ont. Euthymol tooth paste, as its name indicates, depends in large measure for its value upon euthymol, a preparation that has long been employed by surgeons wherever perfect antisepsis was desired, and has moreover deservedly gained universal popularity because of its freedom from danger except to germ life.

"To the mind of the writer this preparation warrants specific mention, inasmuch as it offers the ideal of a dentifrice in that it is at the same time a powerful antiseptic, reasonably detergent, modest in price, pleasant in odor, and exceptionally grateful to mouth and gums, while last, but not least, its use affords a positive protection against foul breath and other conditions peculiar to the mouth that lead to retraction and softening of the gums, staining of enamel, formation of tartar, and decay. It is likewise a reasonably certain guarantee against a number of diseases which gain entrance to the human organism through germs in the mouth and digestive organs." [*Popular Science News*, August, 1896, page 190.]

WRITE FOR TRIAL PACKAGE.

PARKE, DAVIS & COMPANY,

Manufacturing Chemists,

DETROIT, MICH.

BRANCHES:
NEW YORK: 90 Maiden Lane.
KANSAS CITY: 1204 Broadway.
BALTIMORE: 8 South Howard St.
NEW ORLEANS: Tchoupitoulas and Gravier Sts.

BRANCH LABORATORIES:
LONDON, Eng., and WALKERVILLE, Ont.